



GOVERNMENT OF NORTHERN IRELAND.

EIGHTH ANNUAL REPORT
OF THE
MINISTRY OF AGRICULTURE
1928 - 1929.

*Presented by Command of
His Grace the Governor of Northern Ireland.*

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GOVERNMENT HOUSE,

HILLSBOROUGH,

NORTHERN IRELAND.

20th December, 1929.

SIR,

I have the honour to acknowledge the receipt of your letter, A. 1357/29, of 19th December, 1929, covering the Eighth Annual Report of the Ministry of Agriculture, being for the year 1928-1929.

This Report will duly be laid before the Governor.

I am, Sir,

Your obedient Servant,

OSCAR HENDERSON,

Lieut.-Commander,
Private Secretary.

The Secretary,

Ministry of Agriculture,

BELFAST.

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GOVERNMENT OF NORTHERN IRELAND.

EIGHTH ANNUAL REPORT OF THE MINISTRY OF AGRICULTURE.

TO HIS GRACE, JAMES ALBERT EDWARD, DUKE OF ABERCORN, K.G.,
K.P., GOVERNOR OF NORTHERN IRELAND.

May it please your Grace,

I have the honour to submit the eighth annual general Report of the Ministry of Agriculture for Northern Ireland, covering the Ministry's operations from the 1st October, 1928, to the 30th September, 1929.

The Report is divided into the following sections:—

1. Advisory Committees.
2. County Staffs.
3. Finance.
4. Agricultural Loans.
5. Agricultural Education.
6. Research.
7. Special Horticultural Experiments.
8. Marketing.
9. Agricultural Schemes.
10. Agricultural Laws, including Diseases of Animals Acts.
11. Flax and Potato industries.
12. Forestry.
13. Statistics and Intelligence.
14. Surveys.

1. ADVISORY COMMITTEES.

Meetings of the Ministry's Advisory Committees were held as follows during the past year:—

Consultative Committee 8th March, 1929; 16th April, 1929.

Horses 9th April, 1929.

Cattle 9th April, 1929.

Pigs 11th April, 1929.

Sheep 11th April, 1929.

Potatoes 10th October, 1928; 4th September, 1929.

Dairying	31st January, 1929; 15th February, 1929.
Eggs	9th October, 1928; 22nd January, 1929; 1st March, 1929; 12th April, 1929.
Fruit	14th May, 1929; 3rd July, 1929.

At the invitation of the Trustees, the members of the Ministry's Consultative and Live Stock Advisory Committees visited the Agricultural Research Institute, Hillsborough, Co. Down, on the 24th May, 1929.

The following changes in the personnel of the Committees took place during the year :—

In April, 1929, on the nomination of the Ulster Farmers' Union the Rev. Robert Moore, Ballymacannon, Macosquin, Coleraine, was appointed a member of the Advisory Committee on pigs in succession to the Rev. R. J. McIlmoyle, who had resigned.

The death took place in August, 1929, of Mr. Josias Cunningham, who since the inception of the Ministry, had rendered valuable services as a member of the Consultative Committee and of the Live Stock Advisory Committees. The vacancy on the Consultative Committee was filled by the appointment of Captain T. H. Wallace, M.C., Bishops court, Dromore, County Down, and the vacancies on the pig and cattle advisory committees, respectively, were filled by the appointments of Lieut.-Col. G. V. Hart, D.L., Ballynagard, Culmore, Londonderry, and Mr. M. J. Wauchob, J.P., Laraghs, Newtown Stewart, County Tyrone.

Advisory Committee on Animal Diseases.—The Ministry, having had under consideration the question of the best means of investigating diseases affecting cattle and other livestock in Northern Ireland, deemed it desirable to constitute a small advisory committee comprising persons who possessed a wide experience in dealing with different diseases amongst animals. Accordingly, in July, 1929, a small committee was set up whose functions are to advise the Ministry on all matters in connexion with animal diseases. The committee is composed of the following gentlemen, in addition to the Minister, the Permanent Secretary and the Assistant Secretary :—

S. R. Thompson, M.R.C.V.S., 56, Chichester Street, Belfast.
H. C. I. Kelly, M.R.C.V.S., Church Place, Portadown, County Armagh.

W. S. Lamont, M.R.C.V.S., Oldtown Street, Cookstown, County Tyrone.

H. McConnell, M.R.C.V.S., The Mall, Armagh.

Thomas Hegan, J.P., Desertcreat, Tullyhogue, County Tyrone.

Major William Stewart, Daisy Hill, Clogher, County Tyrone.

F. W. Emery, F.R.C.V.S., Ministry of Agriculture (Diseases of Animals Branch).

Captain J. P. Rice, B.Sc., M.R.C.V.S., Ministry of Agriculture (Animal Diseases Research Division).

H. G. Lamont, M.Sc., M.R.C.V.S., do.

W. R. Kerr, M.R.C.V.S., do.

George Wilson, M.R.C.V.S., D.V.S.M., Ministry of Agriculture (Dairy Bacteriology Division).

This committee met on the 9th July, 1929.

Conferences.

Conferences with officials of county committees of agriculture are held periodically to discuss matters pertaining to the operations of the schemes in general. The following conferences were held during the period covered by this Report :—

County Secretaries, Agricultural Organizers and Instructors in Agriculture—1st November, 1928.

Instructors in Horticulture—23rd November, 1928.

Instructors in Poultry-keeping and Butter-making—29th November, 1928 ; 12th April, 1929 ; 1st June, 1929.

A general conference of secretaries, agricultural organizers, agricultural instructors, and agricultural overseers was also held on the 26th April, 1929, when matters relating to the development of the livestock industry were discussed.

In connexion with the forthcoming Dairy Produce Bill the following meeting was held, in addition to the meetings of the advisory committee on dairying :—

Meeting of special committee of representatives engaged in the export dairy trade to consider draft of the proposed Bill—8th February, 1929.

2. COUNTY STAFFS.

Mr. J. L. McWhinney, A.R.C.Sc., I., N.D.A., was appointed, as from the 1st October, 1928, by the County Down Committee of Agriculture, as successor to Mr. Andrew J. Morrow, who retired from the secretaryship on the 30th September, 1928. As mentioned in last year's report the designation of the post has been altered to "Agricultural Organizer" and the persons appointed to such positions must, in addition to performing the usual secretarial duties, be qualified to act as agricultural organizer for the county and be capable of giving lectures upon agricultural subjects generally, including live stock.

In June, 1929, Mr. J. Marchbank, N.D.D., Principal of the

Greenmount Agricultural and Horticultural College, who has been in the service of the County Antrim Committee of Agriculture for over twenty-eight years—for the first ten years of which he acted as county instructor in agriculture—intimated that owing to the failing state of his health, he found it necessary to resign from his appointment. Mr. R. J. Fannin, A.R.C.Sc., I., N.D.A., who had been employed as a Technical Assistant on the staff of this Ministry since its inception, was appointed to the vacancy by the County Antrim Committee of Agriculture and will take up duty early in October.

3. FINANCE.

Pro forma accounts for the financial year 1st April, 1928, to 31st March, 1929, are shown in the appendices pages 130 to 139 inclusive.

The total final expenditure for that year, including that incurred through local authorities, may be summarized under the following broad heads :—

	£
Agricultural Research and Faculty of Agriculture (including Building Grant to Queen's University and grants towards endowment of Hillsborough Research Station and capital expenditure thereon)	53,264
Agricultural Education	44,903
Live Stock Schemes	35,758
Flax and Potato Industries	10,653
Marketing of Agricultural Produce	4,748
Forestry	20,623
Collection of Agricultural Statistics	2,244
Subsidies to Shows	2,060
Improvement of Dairying	1,810
Miscellaneous Agricultural Services	1,407
Ordnance and Geological Surveys	8,560
Diseases of Animals Acts	25,813
General Expenses	47,060

£258,903

Expenditure was for the greater part defrayed direct from votes of the Parliament of Northern Ireland. A contribution of £10,767 was made from local rates, being the produce of a rate of one penny in the pound levied by the several county councils for the purposes of agriculture and other rural industries in accordance with Section 78 (1) of the Education Act (Northern Ireland), 1923. In addition, a sum of £3,465 was contributed during the

year by local authorities towards the expenditure of £25,813 shown as incurred in connexion with the Diseases of Animals Acts. A contribution of £10,551 towards the same object was made from the General Cattle Diseases Fund for Northern Ireland as established by the Administrative Provisions Act (Northern Ireland), 1926.

A sum of £9,156 in aid of expenditure on Live Stock and Poultry Schemes was advanced from the Agricultural Development Fund as established by the Exchequer and Financial Provisions Act (Northern Ireland), 1927.

The second assessment on local authorities for the purpose of the General Cattle Diseases Fund for Northern Ireland was made during the year, a total sum of £5,337 being levied, representing a rate of one farthing in the pound on the net annual value of the property in the several administrative counties and county boroughs.

4. AGRICULTURAL LOANS.

(a) *Purchase of Bulls.*—During the year five loans were granted for the purchase of premium bulls; in addition subsidies were granted to three groups of farmers towards the purchase of one stock Shorthorn bull each. The breeders concerned are required to keep the bulls for five years for the service of pure-bred Shorthorn cows.

(b) *Purchase of Stallions.*—Six loans were granted for the purchase of stallions. Four of the animals were Thoroughbreds, of which three were purchased in England and one in Northern Ireland. One Clydesdale was purchased in Scotland and one in Northern Ireland. The Thoroughbreds were located in counties Down, Fermanagh, Londonderry and Tyrone, and the Clydesdales in counties Antrim and Armagh. Each borrower was also given a subsidy, equal in the case of the Thoroughbreds to two-thirds of the purchase price, and in the case of the Clydesdales to one-half of the purchase price, and was required to bind himself to keep the animal for the period of the loan, viz., 5 years, in the district in which it has been located.

(c) *Purchase of Agricultural Machinery.*—Two loans were granted—one for the purchase of a farmers' cart weighbridge and the other for the purchase of a Fordson tractor.

(d) *Fencing.*—Five loans were granted under this scheme, which it will be recollected was devised to encourage farmers in poor districts to fence their arable land or to fence off mountain grazing so as to permit of holdings being used to the best advantage.

(f) *Purchase of Seeds and Artificial Fertilizers, 1929.*—This temporary scheme which came into operation in the spring of 1929, was designed to enable farmers to purchase the seeds and artificial fertilizers necessary for the economic working of their holdings. The terms and conditions of the scheme are :—

(1) Loans to be issued through banks on promissory notes, discounted at $5\frac{1}{2}$ per cent. Loans granted on or before 30th June, 1929, to be repayable by two equal instalments on the 31st December, 1929, and 31st December, 1930, respectively. Loans granted on or after 1st July, 1929, to be repayable in full on 31st December, 1930. Loans might be repaid in full at any time during their currency. Borrowers were required to provide two sureties to be approved by the Ministry of Agriculture. In no circumstances would security other than personal security be accepted.

(2) Applications for loans were made on the prescribed form, to be obtained at any of the branches in Northern Ireland of the following banks :—Bank of Ireland, Belfast Banking Company, Limited ; Hibernian Bank, Limited ; Munster and Leinster Bank, Limited ; Northern Bank, Limited ; National Bank, Limited ; Provincial Bank of Ireland, Limited ; Ulster Bank, Limited. Applications for loans for the purchase of seeds or for the purchase of seeds and artificial fertilizers were required to be lodged with the Ministry not later than the 31st May, 1929, but applications for loans for the purchase of artificial fertilizers alone will be accepted up to 31st December, 1929.

(3) Application forms, when completed, to be forwarded to the Ministry of Agriculture, Wellington Place, Belfast.

(4) If a loan is approved, notice to be sent to the applicant and to the manager of the particular branch of the bank selected. On receipt of such notice, the applicant and his approved sureties to attend at the bank to complete the promissory note.

The Ministry to notify the applicant if his application had not been sanctioned.

(5) Payment of the full amount outstanding may be demanded by the Ministry if at any time the circumstances in any particular case are, in the opinion of the Ministry, not satisfactory, or if any loan has been used for purposes other than those contemplated by this scheme.

(6) The decision of the Ministry of Agriculture on all matters affecting the issue of these loans to be final.

The following table summarizes the operations under the scheme during the period under review :—

County	Applications received	Applications cancelled	Applications refused	Applications granted	Amount of loans granted
Antrim ..	6	—	2	4	£ 47
Armagh ..	35	3	6	26	309
Down ..	46	6	8	32	724
Fermanagh	50	5	21	24	351
Londonderry	13	2	1	10	214
Tyrone ..	32	4	6	22	327
Total ..	182	20	44	118	£1,972

Scheme for the improvement of agricultural holdings by drainage and other works and for extending employment in rural areas.—In March, 1929, the Ministry was authorized to consider applications for grants under a scheme devised with the two-fold object of reducing unemployment and assisting farmers and land owners to carry out on their holdings works of drainage, etc., excluding works to be undertaken by county councils under the Drainage Act, 1925. A copy of the scheme will be found at page 147 of the appendices to this report.

The main provision of the scheme is that a farmer carrying out approved work can receive a grant of half the total cost of the operations, subject to the proviso that he can not in any case receive more than the amount actually paid to unemployed men engaged specially for the work. The scheme further provides for the supplementing of grants in certain instances by loans which can be obtained on the security of a promissory note or of a charge on the holding concerned.

With very few exceptions the work of the men employed on approved schemes and recruited from local employment exchanges was of a most efficient character.

The following figures show the operations under this scheme up to 30th September, 1929 :—

Number of applications received	..	74
„ grants approved	..	54
Amount of grants approved	..	£4,306 12 11
Number of applications for loans	..	12
„ loans granted..	..	6
Amount of loans granted..	..	£228

A number of the applications received were still under consideration at the date of the preparation of this report.

5. AGRICULTURAL EDUCATION.

The increasing demand for courses of technical training in agriculture and technical advice combined with the developing interest shown in the experimental and demonstration work carried out by the county instructors indicates that Northern Ireland farmers are becoming more alive to the advantages of the application of science to agriculture. The itinerant instructors employed under the county committees of agriculture have played a most important part in stimulating the desire of farmers to improve their methods, inasmuch as they have been in the position through the media of experiments and demonstrations to prove practically to the farming community the benefits of the application of scientific methods.

In addition to the large number of students who during the year took out courses at the Ministry's residential schools and at local classes in the different counties, the demand for the advanced course of University training in agricultural science is steadily improving. A most suitable type of young Northern Ireland farmer is now coming forward for the examination which is held annually by the Ministry for the award of scholarships tenable at The Queen's University of Belfast. At the close of the academic year 1928-29 four agricultural students completed the courses and obtained the degree of Bachelor of Agriculture, making a total of fourteen students who, since the establishment of the Agricultural Faculty of the University in 1924, have qualified for this degree.

The demand for trained men continues to exceed the supply and all the graduates of the Faculty have found suitable employment in the agricultural industry.

Scheme of Itinerant Instruction in Agriculture.

The following table gives details of the duties carried out by the instructors employed under this scheme :—

County	Instructors employed	Farms visited	Lectures delivered	Attendances at lectures	No. of field experiments carried out	No. of demonstrations laid down
Antrim ..	2	821	14	501	52	234
Armagh ..	1	592	9	219	20	154
Down ..	2	889	13	513	40	173
Fermanagh	1	682	4	127	14	125
Londonderry	1	498	9	438	14	105
Tyrone ..	3	1,523	25	1,281	41	320
Totals ..	10	5,005	74	3,079	181	1,111

Agricultural Overseers.

As in the previous year the total number of overseers employed by county committees was sixteen. Under the supervision of the instructors in agriculture these officers were responsible for laying down nearly 2,600 demonstration plots and for conducting live-stock demonstrations, such as the dishorning of calves, calf-rearing, pig-feeding and the feeding of dairy cows. The giving of advice to farmers on problems of a local character was also an important feature of the work carried out.

The policy in connexion with the employment of overseers has been to arrange that their work will be carried out in the more backward districts where the introduction of new varieties of seeds is likely to be slow and where up-to-date methods of manuring would be of most benefit. The demonstration plots are, as far as possible, laid down where the results are readily apparent to the farmers in the neighbourhood and afford excellent object lessons on the benefits to be secured by an intelligent application of the recommendations contained in the Ministry's leaflets.

The number of farms visited and demonstrations laid down in each county by the sixteen agricultural overseers employed were as follows :—

County	Overseers employed	Farms visited	No. of demonstrations laid down
Antrim	2	2,013	337
Armagh	2	2,187	371
Down	2	1,454	320
Fermanagh	3	2,796	407
Londonderry	3	3,508	463
Tyrone	4	3,737	658
Totals	16	15,695	2,556

The foregoing figures include demonstrations with wild white clover and phosphatic manures, details of which will be found at page 23.

Winter Agricultural Classes.

During the 1928-29 session 350 students attended these classes which were distributed over 20 centres, as compared with 278 students at a similar number of centres in the previous session. Of the total number of students enrolled 142, whose attendance was regular and whose answering at the final examinations was satisfactory, were awarded certificates. Courses of instruction in agriculture and horticulture were given at each centre while

practical lessons in veterinary hygiene were given at classes in four counties. In addition, instruction in poultry-keeping was given at the four centres in county Antrim.

Table showing the class centres and the number of students enrolled at each centre :—

County	No. of Centres.	Centres	No. of Students enrolled
Antrim	4	Aghalee	11
		Ahoghill	18
		Clough	17
		Connor	16
Armagh	2	Cullyhanna	24
		Kingsmills	10
Down	4	Annaclone	16
		Ardkeen	9
		Downpatrick	10
		Kilkeel	14
Fermanagh ..	2	Cashel	21
		Ederney	17
Londonderry ..	2	Maghera	30
		Claudy	30
Tyrone	6	Beragh	27
		Clogher	23
		Drumquin	14
		Galbally	17
		Gortin	15
		Minterburn	11

Particulars of this scheme will be found at pages 21-24 of the appendices to the Ministry's annual report for 1922.

Greenmount Agricultural and Horticultural College.

This college, which is situated about one mile from the town of Antrim, in a highly successful agricultural district, possesses the most modern equipment for a training in agriculture and affords accommodation for fifty students in addition to the resident staff. The farm, which now comprises 242 statute acres, is worked as a mixed tillage farm with a herd of pure-bred and cross-bred dairy cows. The farm buildings are suitably designed to fulfil the requirements of the farm and dairy. There is also a large garden and orchard with glass-houses providing facilities for vegetable-growing, fruit cultivation and bee-keeping, while horticultural students are given a thorough and complete course that aims at embracing all operations connected with the garden, orchard and apiary.

In 1928-29, 48 scholarships, each of the value of £65, covering tuition, board, residence and ordinary medical attendance, and tenable at the College during the session October, 1928, to July, 1929, were offered by the various county committees of agriculture in Northern Ireland for competition among young men in their respective counties. The examinations were conducted by the Ministry at selected centres in the six counties, candidates being subjected to a test in English, Arithmetic and Agriculture (written and oral). As a result of these tests 39 candidates were awarded scholarships and entered the college with a view to taking out the course in agriculture.

The number of scholarships offered and awarded by each county committee of agriculture were as follows :—

	Offered.	Awarded.
Antrim	15	8
Armagh	4	4
Down	14	14
Fermanagh	2	2
Londonderry	5	3
Tyrone	8	8
	<hr/> 48	<hr/> 39

Particulars as to careers, subsequent to the completion of their training, of students who passed through the College during the period January, 1922-August, 1927, appeared in the Ministry's annual report for the year 1927-28. The following table gives similar information regarding students who attended courses at the College during the school years 1927-28 and 1928-29. It will be observed that approximately 96% of these students took up an agricultural career on leaving.

(a) Following farming in Northern Ireland	65
(b) Obtained posts of an agricultural nature in Northern Ireland	4
(c) Emigrated to follow farming	1
(d) Took up non-agricultural work	3
	<hr/> 73

In addition three of the students in these years obtained scholarships in agricultural science tenable at the Agricultural Faculty of the Queen's University of Belfast and are now taking out an advanced course of training at the University.

A special short course of practical training in agriculture was held at the college for the benefit of applicants for the Ministry's scholarships in agricultural science, 1929-30. This course opened on 2nd September, 1929, and continued for about four weeks.

University Scholarships.

As in former years the Ministry offered for competition amongst young men in Northern Ireland who intend to specialize in technical agriculture six scholarships in agricultural science, each of the value of £100 per annum and tenable for four years in the Faculty of Agriculture of the Queen's University of Belfast. To be eligible to compete for these scholarships applicants must have been registered as matriculated students in the Faculty of Agriculture or Science of that University or have passed an examination accepted by the University authorities as equivalent to that matriculation examination. In addition, candidates must not be less than 17 or more than 30 years of age on the 15th day of November in the year in which the scholarship is awarded. The scholarships are awarded on the results of an examination conducted by the Ministry at Greenmount Agricultural College. The Ministry demands a high standard of answering at this examination, which consists of a written, oral and practical test in agriculture.

In connexion with the award of scholarships for the academic year 1928-29, 25 candidates were summoned to attend the examination, which was held on the 5th October, 1928, and of these 24 attended. As a result of the examination, the following candidates were awarded scholarships :—

- A. G. Hamilton, Roselle, Whitehead, County Antrim.
- R. A. Hamilton, " Riverside," Annalong, County Down and Greenmount College.
- T. N. Greeves, Grange, Moy, Co. Tyrone.
- J. G. Reid, Parkmount, Doagh, County Antrim, and Greenmount College.
- R. M. Chambers, Tullynaskeagh, Downpatrick, County Down.
- P. J. Conway, Ballycassidy, Ballinamallard, County Fermanagh.

The following table shows the number of the Ministry's scholarship holders in attendance at lectures in the Faculty of Agriculture during the academic year 1928-29 :—

1st year students	..	..	..	6
2nd	..	..	..	6
3rd	..	..	..	5
4th	..	..	..	4
<hr/>				
Total	..	..	..	21

A satisfactory report having been received from the University authorities in regard to 5 first year, 6 second year and 4 third year students, the scholarships held by these students have been renewed for the academic year 1929-30. Owing to unsatisfactory

attendance and progress of two students in the 2nd and 3rd year respectively the Ministry was compelled to withdraw the scholarships held by these students. Having passed the necessary examinations, the four fourth year students received the Degree of Bachelor of Agriculture, two obtaining honours in agricultural chemistry.

In addition to the scholarships awarded by the Ministry in the Faculty of Agriculture three students holding scholarships from the Gibson Trust Fund and five fee paying students were taking out the course.

Ulster Dairy School.

This school, which is maintained by the Ministry and has accommodation for 50 pupils in addition to the teaching and domestic staff, provides for young women in Northern Ireland a sound practical education in all matters connected with woman's activities in ordinary farm life. Instruction is afforded in dairying, poultry-keeping, rural housewifery, including cookery, laundry and home-sewing, and in the principles of first-aid and sick nursing. This training is designed mainly for girls who, on the completion of their course, return to their own homes. It is to be borne in mind, however, that advanced courses of instruction are provided for girls of outstanding ability who intend to qualify as teachers of poultry-keeping and dairying. The dairy herd of about forty-five cows belonging to the school, is made up principally of pure-bred dairy shorthorns and registered dairy short-horn crosses and pupils are thus enabled to become familiar with every aspect of dairying. The poultry runs are all of modern type and the poultry department is thoroughly equipped with the most up-to-date houses and appliances. Pens of the principal breeds of both hens and ducks are maintained in order that pupils may acquire a knowledge of the laying characteristics of each. The large and fully equipped kitchen and laundry are reserved entirely for the use of the pupils, thereby affording them a thorough practical experience of cookery and laundry work.

The attendance during each of the four sessions at the school was as follows :—

Term.	Attendance.
9th October–21st December, 1928	.. 49
3rd January–22nd March, 1929	.. 49
2nd April–14th June, 1929 ..	.. 49
16th July–27th September, 1929	.. 50
Total	197

Forty-five pupils qualified for the award of the school certificate, and five girls, who desired to qualify for the post of itinerant instructor in poultry-keeping and butter-making, were selected

for a twenty weeks' course at an approved poultry farm in Northern Ireland. Five creamery apprenticeships were also awarded.

During the school year ended 27th September, 1929, 100 girls, of whom 32 had entered during the previous year, received instruction at the school. The training of 75 pupils was completed, 6 having been in residence for one term, 12 for two terms, 37 for three terms and 20 for four or more terms. In addition, one student completed the prescribed course for girls desirous of qualifying as itinerant instructors in poultry-keeping and butter-making. On the completion of her course she was submitted to a final examination and as a result of her answering the Ministry certified her as a qualified teacher or instructor in poultry-keeping and butter-making.

During the year over 500 members of the farming community visited the school in order to see the work in progress. These visits have been of material help in increasing the demand for training at the school.

The farm was enlarged by the purchase of adjoining plots containing in all $15\frac{1}{2}$ acres, and now extends to about 338 acres. It is managed with the main object of maintaining the herd of cows necessary in connexion with the instruction provided in dairying. To this end, the crops grown are principally those which can be utilized for feeding the cows and young stock reared on the farm. Home-grown produce is also utilized for pig fattening, together with the separated milk available from the dairy. In addition, the poultry section is provided with home-grown oats and a plentiful supply of separated milk.

In conjunction with the cultivation of crops, experimental plots to test varieties of potatoes, oats and swedes were arranged, while plots comparing mixtures of grasses and clovers and manures for pastures were also included. Several feeding experiments with pigs were carried through and six of the experimental lots were exhibited at the show of the Royal Ulster Agricultural Society at Balmoral.

In the poultry department, experiments comparing the profits from March hatched and May hatched White Wyandotte pullets were conducted and the results, which showed that early hatching is essential for poultry profits, were of considerable interest both as a demonstration to the pupils and also to visitors at the Ministry's educational display at Balmoral, where the birds with their records were exhibited.

North-West School.

There is accommodation for twenty-four pupils at this school and instruction in poultry-keeping, butter-making and rural housewifery is provided. Four courses, each of about 11 weeks' duration as in the case of the Ulster Dairy School, are held

annually and free scholarships tenable at the school are granted by all county committees of agriculture in Northern Ireland for girls resident in their respective counties. The instruction given at this school, while primarily designed for girls who on the completion of the course intend to return to their own homes, forms an excellent preliminary training for girls who desire to take out a more extended course at the Ulster Dairy School. Twenty-one girls, who had taken out a course at the North-West School and who, in view of their progress, were regarded as suitable for further training, were approved by the Ministry for admission to the Ulster Dairy School during the past year.

An illustrated prospectus of this school, known until recently as the North-West Agricultural School, is now produced in printed booklet form as in the case of the Ulster Dairy School.

The attendance of pupils at the school during the period 9th October, 1928—27th September, 1929, was as follows:—

Term.	Attendance.
9th October–21st December, 1928 ..	20
3rd January–22nd March, 1929 ..	21
2nd April–14th June, 1929	23
16th July–27th September, 1929 ..	22
	—
Total	86

There is a farm of about 52 acres attached to the school with a steading of buildings erected in 1925. The farm is utilized largely for the carrying out of experiments with potatoes, turnips, oats, and other crops; and for the growing of extension plots of new varieties or strains of oats raised at the Plant Breeding Division, Stormont. An extensive potato variety test comprising upwards of fifty varieties and including the chief new varieties of promise was carried out last year. Other tests had for their objects the effect on yield of cutting seed potatoes, the influence of stale drills and dry conditions at planting time on the crop and yield, a comparison of different methods of manuring potatoes and a comparison of varieties of swedes and mangels.

Several pig experiments were carried out. These comprised a comparison of the Ulster, the Large York and first cross pigs for bacon production and a comparison of different meal mixtures for fattening. Four experimental lots of pigs fed at the school were shown in the Ministry's educational exhibit at the annual show of the Royal Ulster Agricultural Society.

The large fruit and vegetable garden, besides providing fresh supplies for the school, is utilized for further experimental work. The testing of different varieties of fruits and vegetables is in progress while many experiments on the control of diseases and

pests of fruit trees and bushes were continued during the year. A combination of apple growing and poultry keeping is now a routine practice which is proving to be of benefit to each department.

A public demonstration of the experimental work in progress was held on the 17th September. This was attended by farmers from the surrounding districts and the opportunity was taken of showing them over the school, farm buildings, farm and garden in addition to the experiments.

Agricultural Experiments.

The agricultural experimental scheme in operation during the year was on similar lines to the schemes of previous years. The alterations and modifications are given in detail at page 140 of the appendices to this report. The following table shows the number and nature of field experiments carried out :—

Experiments	Manurial experiments	Variety of seeds experiments	Residual value experiments	Liming experiments	Others *	Total
Potatoes ..	14	26	—	—	—	40
Turnips ..	—	18	—	—	—	18
Mangels ..	—	12	—	—	—	12
Oats ..	13	37	—	—	—	50
Wheat ..	3	5	—	—	—	8
Hay ..	8	—	—	—	15	23
Wild white clover ..	—	—	7	—	14	21
Grazing ..	—	—	—	6	3	9
Totals ..	38	98	7	6	32	181

* Includes wild white clover nationality trials, special experiments with mixtures of grass seeds and experiments with seeds mixtures which are now in grazing.

Horticultural Experiments.

Substantial alterations, which are indicated at page 143 of the appendices to this report, were made in the scheme of horticultural experiments. The following table shows the number and nature of the experiments carried out during the year :—

County	Apple scab	Manuring apple trees	Manuring black currants	Apple thinning	Black currant mite
Antrim ..	1	1	1	1	1
Armagh ..	2	1	4	2	3
Down ..	2	2	—	2	1
Fermanagh *	—	—	—	—	—
Londonderry ..	1	—	1	1	1
Tyrone ..	1	—	—	1	1
Totals ..	7	4	6	7	7

* New instructor took up duty in December, 1928.

Livestock Experiments.

Experiments in the feeding of calves for "baby" beef were discontinued except where an experiment had not been completed. An experiment to ascertain the comparative values of two mixtures of cakes and meals for the production of "baby" beef was carried out at four centres in the counties of Down and Tyrone.

A pig feeding experiment to compare Large White Ulster Pigs, Large White York and Large White Ulster first-cross pigs, and large White York pigs for bacon production was carried out at five centres in the counties of Antrim, Down and Tyrone.

A pig feeding experiment to determine the value of a mixture of minerals with and without added protein in the feeding of pigs was carried out at four centres in the counties of Armagh, Fermanagh and Tyrone.

Other Experiments.

In addition to the experiments contained in the official scheme many other experiments of local interest were conducted by the instructors in agriculture, and the results are published in the reports of the several committees of agriculture.

Demonstrations.

During the period under review the number of plots laid down by instructors and overseers was 3,700 or an increase of 200 on the number for the previous year. The object of these plots is to show farmers the advantages of adopting more up-to-date methods of cultivation and manuring and of raising more suitable varieties of farm crops. A considerable number of the plots are intended to show how the value of the pasture may be improved by the use of suitable seeds mixtures.

As these plots were, generally speaking, distributed over Northern Ireland, farmers in practically all districts were afforded opportunities of seeing for themselves the advantages which result from the adoption of improved methods. In some cases meetings of farmers were arranged at the plots when the instructor or overseer of the district attended and explained the treatment which had been given.

Improvement of Pastures.

The programme of demonstration work in connexion with the Special Development Grant again received special attention, particularly in regard to the laying down of wild white clover plots and demonstrations with phosphatic manures. The

following table shows the number of these plots laid down in each county:—

County	Wild White Clover. Number of Plots.		Phosphatic Manure. Number of Plots.	
	1927/28	1928/29	1927/28	1928/29
Antrim	114	164	98	107
Armagh	65	81	118	72
Down	65	115	69	97
Fermanagh	85	31	141	159
Londonderry	103	109	108	124
Tyrone	167	219	162	200
Totals	599	719	696	759

Exhibits at Agricultural Shows.

The exhibit staged by the Ministry at the 1929 annual show of the Royal Ulster Agricultural Society at Balmoral, although generally similar to that staged in 1928, included many new features of practical importance. The same object—how the farmer may increase his income or reduce his outlay—was continually kept in view. Practically all branches of agriculture received attention, while actual demonstrations were again a valuable feature of the display. The chief sections of the exhibit in brief outline were:—

Agricultural Education.—The facilities available for young men and young women to obtain instruction in the various branches of agriculture were made known. The varied phases of a young man's agricultural education, starting with the winter agricultural classes, followed by Greenmount Agricultural and Horticultural College and finally ending with the Agricultural Faculty of Queen's University, Belfast, were displayed. Examples of the work done under these organizations were demonstrated.

In the same way the facilities for the agricultural education of a girl, beginning with the poultry and butter-making classes held in the counties, followed by the North West School, Strabane, and finishing with the senior courses at the Ulster Dairy School, Cookstown, were demonstrated.

Livestock.—The exhibits in this section were designed to emphasize the importance of the livestock industry, and to show the necessity which exists for the keeping of good quality stock, and for efficient methods of management and marketing. Live animals were shown to illustrate:—

- (1) The advantages of milk recording ;
- (2) The production of baby beef in comparison with stores ;

- (3) The rearing of calves on a home produced food, *i.e.*, crushed oats ;
- (4) The methods of dishorning calves ;
- (5) The improvement of mountain breeds of sheep by the use of good rams ;
- (6) The merits of Large White Ulster Pigs, Large White York Pigs, and First Cross Ulster x York Pigs for bacon purposes ;
- (7) The cost of rearing bonhams until the weaning stage ;
- (8) A comparison of raw and cooked meal mixtures in pig-fattening ;
- (9) The results on live weight gain and on quality of bacon from feeding pigs on different rations ;
- (10) The correct type of pig for the small pork trade and for the bacon trade ;
- (11) The value of minerals in the feeding of livestock.

Crop Husbandry.—Attention in this section was devoted mainly to potatoes, cereals, flax and pasture. Results of experiments were illustrated to show the improved potato yields obtained from the use of seed from healthy stocks. The comparative values of the different varieties of potatoes were shown and also the requirements of the Marketing of Potatoes Act.

The suitability of certain varieties of cereals for certain districts as shown by a series of experimental results was emphasized. The management of pasture received more attention than in previous years.

Dairying.—Demonstrations on the production of "Grade A (T.T.)" milk were given at intervals on each day of the show. The fact that there are now 20 licensed producers in Northern Ireland indicates the interest which was taken in this section in previous years. The value of milk as a food was demonstrated and the necessity for providing milk of "Grade A (T.T.)" quality was stressed. A special exhibit was staged to illustrate the work which has been done to improve the quality of creamery butter in Northern Ireland, and a list of those creameries which have been authorized to use the Ministry's stamp was displayed.

Poultry Keeping.—The exhibits in this section were intended to show the most profitable methods of poultry management, and dealt with breeding, hatching, rearing, culling, feeding and housing of poultry.

Horticulture and Bee-Keeping.—The horticultural section dealt principally with the methods employed in controlling diseases and pests which affect fruit and vegetables. Further important exhibits were those emphasizing the value of vegetables and pointing out the methods for their successful cultivation. Plots

of early cabbage showing results of manuring provided another striking exhibit of considerable interest and value.

In the bee-keeping section, modern appliances and equipment were displayed and methods of management of stocks and of treating disease demonstrated. The proper marketing of honey also received special attention.

Animal Diseases.—In this section particular emphasis was given to the prevention of liver fluke, garget or mastitis, sterility and abortion in cattle, worms in pigs, gapes and bacillary white diarrhoea in chickens.

Marketing.—The proper methods of preparing produce for market and the effects of such methods on our trade and also as a means of increasing consumption and thus encouraging further demand were illustrated. While eggs and poultry received most publicity, the marketing of potatoes, pork, butter, apples and honey was also included.

Publications.—The demand for the Ministry's leaflets and other publications was even greater than in previous years, while the bureau for the sale of ordnance survey maps gave visitors an opportunity of purchasing or ordering maps required.

6. RESEARCH.

Chemical and Animal Nutrition Division.

In the annual report for last year it was recorded that the division had entered into occupation of its new quarters in Elmwood Avenue. This, together with the fact that the Hillsborough farm of the Agricultural Research Institute is, by arrangement with the Board of Trustees, now available for field work, has enabled the division to extend its scope.

Soils and Fertilizers.—The investigation into the liming problem in Northern Ireland outlined in last year's report, and designed to obtain information as to the benefits of liming from the point of view of the feeding value of crops as well as that of yield, has been put into operation. This experiment is being conducted at Hillsborough and, in order to amplify its results, further trials, on a modified scale, have been commenced at three other centres. The investigation must necessarily be continued for several years before any definite conclusions can be drawn.

Considerable attention has recently been given to the question of the correct balance of artificial fertilizers for the potato crop. Some evidence has been collected in England which suggests that the mixture recommended by the Ministry could be improved

by increasing substantially the amount of nitrogen which it contains. Considerable publicity is being given to such results, and as nitrogen is the most expensive ingredient in mixtures of artificial fertilizers, a comprehensive manurial experiment was laid down on the potato crop at the Hillsborough farm with a view to testing the validity of the statement under North of Ireland conditions. The results of the experiment showed that no increase in crop was obtained by increasing the proportion of nitrogen in the mixture of artificial fertilizers or by increasing both the proportion of nitrogen and potash. A further experiment on the same lines has also been laid down with a view to securing additional data.

Poultry.—During the year 1,800 chickens were reared at the Poultry Research Station, Hillsborough, and utilized in connexion with the nutritional work of the division.

It may be of service to explain the main facts which have emerged from such work during the past two years. The results so far obtained have established the fact that the most rapid growth and development in young chickens is obtained on a simple cereal mash with unlimited supplies of clean separated milk to drink. Growth on such a ration proceeds at more than double the rate obtained on a ration of cereals with water to drink. It has also been possible to construct a ration consisting of a mixture of cereal foods supplemented by feeds rich in protein and mineral matter, which gives as good results as milk. The previous year's experimental work also showed that if the chickens were reared properly a weight of $3\frac{1}{2}$ lb. could be attained in 13 weeks and that the birds were so well fattened that it was not possible to improve their condition by intensive feeding at a poultry fattening plant.

Attempts made during the past year to explore further the possibilities of replacing separated milk by cheap and readily procurable feeding stuffs have proved successful. It has been found that a ration consisting of cereal meals, together with 18 per cent. of extracted soya bean meal and 4 per cent. of a mineral mixture, provides a cheap and effective substitute for a ration consisting of mixed cereals and access to unlimited supplies of separated milk. This mash is much more suitable for the practical poultry keeper than that employed for the same purpose in last year's experiment, inasmuch as it is cheaper and very simple to make up. A repetition of the growth experiment carried out in 1928 confirmed the conclusions then drawn that the success obtained in the feeding of milk is, to a large extent, due to the mineral matter in the milk and to the amount and high digestibility of the protein that it contains.

A review of the live-weight returns from the various rearing

rations during the year indicates that the largest demands for flesh-forming and bone-forming material in the nutrition of a chicken are made during the first few weeks of its life. As the chicken grows older these demands decrease and towards maturity the amounts, which in the earlier stages were necessary, become actually prejudicial to maximum growth. It is also evident from these results that cockerels require a ration containing a larger proportion of protein and mineral material than in the case of pullets, and in actual practice a ration which will give full growth with pullets is inadequate for young cockerels.

A growth experiment was carried out this year in conjunction with the poultry division and particulars of this experiment are given in the report from that division.

Rearing Laying Experiments.—In order to test the effect of rearing on subsequent egg yield, the pullets reared in the 1928 growth experiment were placed in laying pens and all groups were fed on a standard laying mash. The egg yields for the first year show that better rearing is reflected in increased egg production and, further, that the eggs which go to make up this increase are laid during the most profitable period, namely from September to December.

A further experiment consisting of five groups of birds reared and fed under identical conditions was commenced in the autumn of 1928 with the object of ascertaining whether the standard mash fed to the birds in the Stormont laying trials could be improved upon from the point of view of egg production and size of egg. This experiment will not be completed until the autumn of 1930.

Further experiments have also been planned with the object of exploring the possibility of including more home grown foods, such as oats, in the rations for laying birds.

Perhaps the most striking indication of the importance of nutrition in egg production is afforded by the production record of the pullets for the first completed year at Hillsborough. These birds were obtained as day-old chicks from six breeders in Northern Ireland, and in all between 600 and 700 were secured. The cockerels were disposed of when fat and from the remainder 257 pullets were retained for the laying experiments. The egg production for the 12 months commencing 1st September, 1928, and ending on 31st August, 1929, was 194.4 eggs per bird, calculated on the original 257 birds penned on the 1st September, 1928. Of these 16 died during the year and no allowance has been made for such deaths. The figure is of particular interest because it shows that, starting with chickens from well managed flocks, it is possible to secure with proper feeding and management an average egg production at least equal to that obtained at the

Stormont laying trials from a selection of the best bred birds in the country.

A preliminary report on the work of the Poultry Research Station at Hillsborough was prepared by the division and submitted to the Empire Marketing Board.

Baby Beef.—The feeding experiment outlined in last year's annual report was carried out. The object of this experiment was two-fold. Firstly, to compare the liveweight gains of two groups of calves in which the "bulk" of the rations was controlled by the amount of hay fed and secondly to determine whether it is possible to include a greater proportion of home grown foods (oats) without lowering the rate of liveweight gain.

The results obtained indicated that the ration containing a high proportion of purchased cake and relatively rich in protein was not superior to a ration containing more home grown food and, consequently, having a lower protein value. The other aspect of the experiment, namely the control of the fodder portion of the ration, was hampered by the poor quality of the hay available and yielded no definite result.

Two further experiments have been commenced with a view to obtaining further data in respect of (1) the protein content of rations for baby beef and (2) the control of bulk.

Pigs.—The quality of bacon is one of the most serious problems confronting the pig industry at the present moment and experimental work in connexion with the effect of feeding on quality has been severely hampered by the lack of a reliable method of comparing different pig fats. After many experiments an apparatus has been designed by the staff of the division which provides a simple and effective method for comparing the firmness of different samples of pig fats.

In a feeding experiment a comparison was made between rations containing maize meal, tapioca root flour, ground oats and barley meal respectively. There was little difference in the rates of growth for the four groups of pigs, and it is interesting to note that the fat from the pigs fed on tapioca root flour and ground oats compared very favourably with that from pigs fed on the barley meal ration. This confirms the results of a previous experiment in which economic liveweight gains and satisfactory bacon was obtained from pigs receiving tapioca root flour.

Sheep.—The two experiments in which mineral cubes are being fed to hill sheep have been continued with very promising results. A further experiment is being started on another hill farm where it will be possible to run two separate groups of ewes, and thus make a more direct comparison of the effect of mineral feeding.

Composition of Milk.—It is well known that wide variations in the composition of milk of dairy cows may occur from day to day and that the percentage of butter-fat in the morning milk of an individual cow or a herd of cows may fall below the legal standard. The knowledge of the factors influencing the variations is admittedly incomplete and, while it is not suggested that the present legal standards governing the quality of milk should be altered, it is obviously unfair that a farmer is liable to criminal proceedings for variations in the quality of the milk over which he has, at the moment, no control. An Inter-Departmental Committee composed of representatives from the Ministry of Agriculture and Fisheries of England and Wales, the Scottish Department of Agriculture, and the Ministry of Agriculture for Northern Ireland, has been set up with the object of exploring the factors which influence these variations. In the meantime arrangements have been made for the determination, morning and evening, for a period of a year, of the butter-fat and solids-not-fat in the milk of each individual cow in the herd of dairy cows at the Hillsborough Research Farm, and in addition records of climatic and other factors are being kept. Since the commencement of the experiment in February, 1929, 13,500 samples of milk have been examined. It is hoped, with the help of the data available therefrom, to trace the factors influencing the quality and quantity of milk. These figures will also provide material for making a statistical examination with a view to testing the accuracy of the present method of estimating the total lactation yield of milk and butter-fat of cows for the purposes of the milk recording scheme.

Milk Testing.—A steady development has taken place in the growth of the milk testing work during the past year. There has been an increase of approximately 2,000 in the number of reports issued direct to farmers and this figure has now reached 18,839.

The following table indicates the expansion of the milk recording movement during the last six years :—

Year ended 30th Sept.,			No. of Associa- tions	No. of samples tested
1924	..	..	34	44,543
"	"	"	42	76,936
"	"	"	53	108,448
"	"	"	60	127,690
"	"	"	66	125,879
"	"	"	70	146,993

Pollution of Rivers with Flax Water.—The pollution of streams with flax water resulting in the death of fish has given rise to considerable friction. At the request of the Ministry of Commerce

an investigation was undertaken to ascertain what products present in the flax water were responsible for its poisonous nature.

The results of analyses of a number of flax waters and numerous experiments with fish, both in the field and in the laboratory, indicate that the high dissolved carbon dioxide content and the acidic nature of the ret water is largely responsible for its toxic character. These deductions are borne out by the fact that when flax water is discharged into a rapidly flowing stream, where considerable aeration takes place during the passage of the water over stones, etc., no poisonous effects are found. When, however, flax water passes into a slow running stream where little or no aeration can take place, the fish in the stream are almost invariably destroyed. In the laboratory, under controlled conditions, it is possible to overcome the toxic character of flax water by the addition of chemicals, but this method is not practicable under farm conditions because a slight excess of the ingredients added renders the flax water just as harmful as before.

Adulteration of Butter.—In the annual report for last year reference was made to an investigation into the Reichert-Wollny numbers of butters with a view to obtaining further information as to the validity of the present presumptive standard at certain times of the year. This experiment is being continued and some very interesting data have been recorded. It is hoped, when the figures for the ensuing winter period have accumulated, to publish a report on the investigation.

Analytical Work.—The routine analytical work of the division has been carried on as usual and a number of samples have been analysed in connexion with the Fertilizers and Feeding Stuffs Act.

Advisory Work.—The amount of advisory work carried out by the division has been well maintained. It is interesting to note that, in addition to queries from farmers, quite a number of fertilizer and feeding stuff merchants have sought guidance in the making up of rations, etc.

Miscellaneous.—In connexion with the marking of cold stored eggs the division undertook an examination of the various inks sold for this purpose. Numerous trials, involving the use of many different inks, have been made in the stamping of eggs. Only two of the inks proved completely satisfactory.

Teaching.—The normal programme of teaching in connexion with the Agricultural Chemistry Department of the University has been carried out by the staff of the division.

Publications.

“The Feeding of Poultry.”

By G. S. Robertson & R. G. Baskett. Vol. II, Journal of the Ministry of Agriculture for Northern Ireland.

"Milk Recording in Northern Ireland."

By J. Houston. Vol. II. Journal of the Ministry of Agriculture for Northern Ireland.

Crop and Animal Husbandry Division.

The normal teaching work in the Agricultural Faculty of Queen's University was carried out by the division and in this connexion student demonstrations were held on a number of Ulster farms where features of special agricultural interest exist.

Advisory Work.—The advisory work increased substantially during the year, the enquiries covering a wide field. There was a marked and noteworthy increase in the number of enquiries received for advice and assistance on the renovation, stocking and management of grassland, and also on the general organization of the farm. Advice was given by letter and, where necessary, by means of visits.

Research and Experimental Work.

Sheep.—Vigorous efforts are being made by owners in England and Scotland to eliminate scab from their flocks of sheep and it is possible that before long difficulties will be put in the way of countries where the disease is prevalent exporting their sheep to England and Scotland. This aspect of the problem has recently been receiving the serious consideration of agricultural societies and local authorities in Northern Ireland. It has been demonstrated beyond question that the disease can be eliminated by means of effective dipping of all sheep. Unfortunately, however, facilities for this purpose are not all that they might be, and as a consequence it is sometimes difficult to ensure that the dipping is efficient. During the year equipment for penning and dipping sheep was designed by the division and erected by the Trustees at the Research Farm at Hillsborough. The whole of the constructional work was done by the farm hands and a detailed record of the cost of materials and labour was prepared. Full particulars will be published shortly and it is hoped that the information obtained will be of considerable service to sheep farmers and others.

Drainage.—Land drainage has always been a problem of special importance in Northern Ireland and although a great deal has been accomplished much remains to be done. In Northern Ireland the main problem is to get rid of the surface water effectively. To achieve this object the land drains must be as shallow as cultivation operations will permit. Tile or stone drains involving heavy expenditure on manual labour for cutting the drains is so costly as to be in many cases almost prohibitive. Investigations have shown that the alternative form of draining,

namely, mole draining, is rarely practicable owing to our soil conditions. Experiments were, therefore, arranged with the object of exploring the possibilities of reducing the cost of cutting the drains by employing suitable machinery for the purpose. With this object, a Simplex soil excavator was purchased by the Research Institute and during the past year the division was afforded facilities for making a considerable number of trials and observations with this machine. The excavator proper is a relatively simple and inexpensive machine, which can be operated by engine or horse winch. The tests made showed that the one horse winch was as efficient and less expensive than the engine.

The excavator is designed to cut a trench of 2 feet deep in two cuts of 12 inches each. No difficulty was experienced in cutting the first spit of 12 inches; this was performed with ease, and practically no stoppages. The second cut was not so successful, as numerous stoppages took place owing to the presence of large stones and bog oak. Through clay or peat portions the second cut was made with ease, and a very clean cut trench left ready for tiling.

Under the conditions existing at the experimental centre (which are probably typical of large areas of the country) the main use of the excavator was to cut the top spit of 12 inches. In many places the second cut was made and even in places where large stones were met with, the excavator was of considerable use in loosening the second spit and thus facilitating subsequent digging. The trials showed that where large stones are likely to be met with in the second foot of soil, it would be desirable to modify the excavator so as to increase the width of the top spit from 10 to 12 inches and thus give more room for the men to work in when digging the second spit.

The division arranged for a working demonstration of the machine at the Agricultural Research Institute, Hillsborough, and despite the unpropitious weather there was an attendance during the day of 120 visitors. Great interest was taken in the working of the tackle and many of the visitors remained in the field 4 or 5 hours. There is little doubt that modified as indicated above, the excavator would be of material help where tile or stone drainage is being undertaken. A mole plough was also tried during the demonstration but the results merely confirmed the conclusion already arrived at that this form of drainage has a strictly limited application in Northern Ireland.

Potatoes.—The increasing number of enquiries for seed potatoes from Northern Ireland has directed attention to the factors determining the relative proportion of seed and ware in the crop. There are reasons for supposing that the size of seed tuber planted may influence to a considerable extent the percentage of ware,

seed and chats in the resulting crop and an investigation has, therefore, been started by the division with the object of securing reliable data on this point.

Silage.—Problems associated with the management of grass land have been receiving considerable attention throughout the United Kingdom. It is now realized that efficient grazing of the pastures and, failing that, mowing of the surplus grass is fundamental to good management. In good grass years, such as was experienced during the past season, it is frequently not economically possible to stock the pastures to their full capacity. The division is co-operating in an experiment on a large permanent grass farm in county Down where the surplus grass has been mown. An attempt is being made to convert the surplus grass into silage and for this purpose various portions of the farm buildings are being used as temporary silos.

Cost Accounts.—With the help of the Hillsborough Research Station staff, the division is responsible for keeping a very detailed system of cost accounts, covering all farming operations at that Station. Results for a complete financial year have now been obtained. There is no data of this character so far available in Northern Ireland. Whilst stress cannot be laid on the results for one financial year, it is evident that the accumulation of such data will be of great assistance in the study of farm economics.

General.—The adaption of farm buildings to suit modern requirements with regard to the housing of farm animals is frequently a difficult problem on Ulster farms. The buildings at Hillsborough are 100 years old and although the walls are good, the internal structure and fittings are out of date. The internal reconstruction of the buildings has been undertaken by the normal farm staff. A complete record of the cost, etc., is being kept by the division and full particulars will be published in due time, for the information and guidance of farmers.

Lectures.—Evening lectures were given to several milk-recording associations and an address on "Young Farmers' Clubs" to the North of Ireland Area Conference of Toc H.

Dairy Bacteriology Division.

Grade A. Tuberculin Tested Milk.—Satisfactory progress has been made in developing the work on the production of "Grade A. Tuberculin Tested" milk. There was an increase of nine licence holders during the year under review, and there are at present 20 licensed producers and 3 licensed retailers of "Grade A. Tuberculin Tested" milk in Northern Ireland. It is now possible to obtain milk carrying a government guarantee of

purity and safety in practically any district in the six counties. One of the most encouraging features of the movement is the progress which is being made by the producers in developing their business. With one exception, all the producers have experienced no difficulty in marketing direct the whole of their supplies, and, with the one exception referred to, they have all greatly increased their herds of dairy cows, in some instances to three times their previous numbers.

Several more public institutions such as hospitals, sanatoria, etc. are now specifying "Grade A Tuberculin Tested" when advertising their milk contracts and, slow though this development may be, it affords clear evidence that the medical profession is succeeding in awakening a live interest amongst the governing bodies of such institutions as to the fundamental importance of the milk supply.

It is of interest to note that since the introduction of the Sale of Milk Act there is a decided increase in the number of unlicensed milk vendors who bottle their milk. It undoubtedly makes the product more attractive, but it is of questionable advantage to the consumer. Few of these milk vendors possess any means of sterilizing their bottles—that is to say, cleaning them properly. Indeed some of this milk is actually bottled during the round at any convenient street corner! The ordinary method of delivery from can to jug leaves much to be desired, but with all its undoubted faults it is to be preferred to milk bottled under such circumstances. Real progress can come only with the education of the consumer.

The advantages of having only one grade of licensed milk in Northern Ireland have been emphasized during the year by the numerous resolutions sent by public health bodies to the Ministry of Health (London), protesting against the confusion caused in the public mind by the number of grades of milk in England and Scotland. In particular "Grade A," which is one of the lowest licensed grades in England, has been criticized. Unfortunately consumers in Northern Ireland reading press reports of the proceedings in England have confused the English "Grade A" milk with "Grade A.T.T. milk" in Northern Ireland, which corresponds to the highest grade of milk licensed in England and Scotland.

Tuberculin Tests.—It is generally admitted that the ordinary subcutaneous test, properly carried out with standardized tuberculin, is a perfectly satisfactory test. There are, however, two practical difficulties to be overcome. Only a small proportion of the tuberculin on sale is actually standardized and tuberculin can be bought by any member of the general public. If a reacting animal is given a dose of tuberculin shortly before it is submitted

to an official test, it will usually fail to react. Such a state of affairs is far from satisfactory and might lead to widespread abuse. During the past year the division has been exploring the possibilities of the double intradermal tuberculin test and the conclusion has been reached that this test is much the more satisfactory. The double intradermal test possesses the great advantage that a reacting animal cannot be doped to pass the test, not even if it has been submitted to an informal test a few days before the official test is applied. The staff of the division have spent some considerable time initiating veterinary practitioners into the technical control of this test. The double intradermal test is in process of adoption by all licensed "Grade A.T.T." herds and the question of prescribing its use in connexion with the Sale of Milk Act, 1927, is under consideration.

Sampling.—A total of 932 samples of milk were examined bacteriologically during the year. Of these 169 were surprise samples taken from licensed "Grade A.T.T." milk producers. It is evident from the results obtained that the licensed producers have been doing their work in a highly satisfactory manner and it is doubtful if from the point of view of cleanliness and purity their supply of milk can be equalled anywhere. It is worthy of note that the Medical Officer of Health for the borough of Belfast has written congratulating all the licensed producers in that area on the cleanliness of the milk supplied.

Advisory Work.—Numerous visits were paid to prospective producers and also to licensed producers, and assistance given to them in overcoming varied problems such as the re-organization of their byres, drains, etc., and the purchase of suitable equipment.

Creameries.—Approximately 40 samples were examined in connexion with advisory work on behalf of Northern Ireland creameries. Preliminary experiments were carried out on the examination of starters with a view to determining whether contamination could be proved by bacteriological means before any obvious change was apparent in either the quality of the starter or the butter. This investigation is in progress.

General.—During the year an address on "Clean Milk Production" was given in Dublin at the request of the Irish Clean Milk Society. A paper on the "Progress of Graded Milk in Northern Ireland" was contributed to the Conference of the Certified and Grade A.T.T. Milk Producers' Association at Reading.

Seed Testing and Plant Disease Division.

The division is now well established in its new quarters and is finding material benefit to its work resulting from the removal to the new agricultural building in Elmwood Avenue, Belfast.

Both routine and research work continue to expand. Wider use is definitely being made of advisory services and research has probably reached as great a volume as can be borne by the existing staff.

Closer contact with other research centres in Great Britain and overseas has been established during the year. A considerable number of visits have been received from members of other institutions at home and abroad, and members of the staff of the division have paid visits of inspection to a number of the principal British agricultural and horticultural research stations. They have also attended as delegates of the Ministry at the Imperial Mycological Conference, the Imperial Meteorological Conference, the Congress of British Seed Analysts, and the meetings of the Agricultural Education Association.

(a) Seed Testing.

Samples subjected to full tests during the year totalled 3,184, an advance of some 8 per cent. upon the previous season's aggregate (in addition to about 500 experimental samples). The total was made up as follows:—

From wholesale and retail merchants	71.5 per cent.
From farmers	9.9 „
From Ministry's Official Samplers	7.9 „
From Officers of Public Departments	10.7 „
	100.0 per cent.

The steadily maintained increase is significant, as indicating a widening appreciation of the value attaching to accurate information on seeds. Hand-to-mouth methods are still far too common in the seed business; wholesale and retail purchasing being too long delayed every season. This is a very serious handicap to the potential value of a seed testing station, and it is greatly to be desired that samples should be obtained and purchases arranged earlier so as to give time for testing before sowing. Further, guarantees can always be obtained and should regularly be asked for. There is still room for improvement in these matters, and in order to draw the attention of farmers, who as yet do not make use of the facilities offered by the Ministry's laboratories, further propaganda in the form of leaflets and press articles, has been carried out during the year.

Special reports for the information of farmers, setting out the number of weed seeds per pound, have now become an established feature of the station's services and are evidently appreciated. It is not uncommon to receive farmers' unmachined ryegrass samples containing as many as 100,000 weed seeds to the pound, representing a sowing of weeds of about some five million to the acre, on the basis of a $1\frac{1}{2}$ bushel sowing rate.

TABLE I.

Analysis of samples tested.

<i>Kind of Seed.</i>	<i>Per Cent. of Total.</i>
Ryegrass	69.3 per cent.
Other grasses	7.0 "
Flax	10.3 "
Clovers	8.7 "
Cereals	1.4 "
Roots, vegetables, etc.	3.3 "
	100.0 "

The figures in this table indicate the nature of the samples received. Ryegrasses as usual account for nearly three-quarters of the total. The figure for flax is both relatively and actually below that for the previous year. The number of vegetable seeds received also shows a decline. There is evidence that this is one of the least satisfactory branches of seed commerce. A considerable trade appears to be done in packeted seeds by vendors who have little knowledge of the business.

Table II records the averaged results of the season's tests, with modal figures for the more important species; compared with corresponding figures for previous seasons. All figures in the table refer to tests conducted on the "Continental" system. Only some 400 requests were made for "Irish" tests.

TABLE II.

Species.	No. in Average	PURITY.					GERMINATION.			
		Mode	Average %	Injurious Weeds No. of samples containing:—		No. of samples containing Ergot	Mode % 1928-1929	Average %	Hard seed %	Average of mode or seasons 1923-28
				Over 1%	Over 2%					
Perennial Ryegrass	880	99.0	96.7	142	94	93	82	82	—	86
Italian Ryegrass	436	99.5	96.3	114	68	31	77	75	—	83
Mixed Ryegrass	136	97.8	94.0	41	21	12	74	75	—	83
Crested Dogtail	62	—	96.7	19	13	8	—	88	—	—
Red Clover	87	—	96.0	—	1	4	—	87	6	—
White Clover	28	—	95.4	8	1	—	—	89	6	—
Wild White	47	—	97.1	2	—	4	—	89	8	—
Alsike	34	—	91.3	1	—	—	—	85	4	—
Flax	266	98.5	97.6	—	—	—	92	85	—	89
Timothy	34	—	98.4	1	—	3	—	81	—	—
Cocksfoot	32	—	90.8	—	—	—	—	90	—	—

NOTE:—The "modal" figure is that which occurs most frequently in a series. Thus in the table perennial ryegrass showed a germination of 82 per cent. more frequently than any other figure. The "mode" thus reflects the general quality of seed obtainable more accurately than does the "average."

Ryegrasses were disappointing and gave rise to a great deal of difficulty. The probable cause of the trouble was late frost. Italians were the worse affected but both these and perennials behaved most irregularly in the warehouse—some distinctly improving after storage, others losing heavily. Present indications suggest a much higher quality in this season's produce. Clovers maintained a fairly high standard throughout the season, reflecting better harvesting conditions than for the previous year. The general standard of flax was good. Dutch seed was plentiful and of high germination, while Pernau and Riga seed was short in supply and of poorer quality. Both English and Canadian "J.W.S." maintained a high average germination throughout the season, but it must be noted that the purity of English samples left much to be desired. The nature of the impurities in many cases suggested faulty cleaning. A number of farmers, having obtained tests, decided against sowing this seed because of the high weed content.

The Ministry's inspectors took, during the season, 250 control samples from vendors throughout the province. On the whole, these samples were satisfactory. It is clear, however, that the stringent necessity of having tests revised when samples are kept over year, is not appreciated by merchants.

In the previous report attention was called to the poor quality of much vegetable seed. During the past season a higher standard was maintained. It was observed that, while some wholesalers gave guarantees of purity and germination, and the year in which the seed was packeted, many continued to issue packets without such information. Wholesalers are strongly urged to adopt the precaution of supplying these particulars.

International Seed Testing Association.—The station participated in the usual referee tests upon samples circulated by the Executive of the Association and very satisfactory agreement with other British stations was registered. The work of the sampling committee was continued.

Advisory Work.—Practically all parts of the province are now making use of the advisory services of the division and enquiries covered a great variety of agricultural and horticultural problems. Several interesting instances of suspected poisoning by herbage were met with. Numerous requests for information on seeds mixtures, new crop plants, weeds and the care of pastures and of sports grounds were dealt with.

Research.

Shipping of Seed.—Some further evidence with regard to loss of germination during shipment has been added to that

previously accumulated and a report on this investigation is now being prepared for publication.

Weeds.—Experiments mentioned in the last report upon the use of chlorate of soda for weed destruction have been expanded and have given most encouraging results in the eradication of creeping thistle from arable ground. In a trial on the farm of the Hillsborough Research Institute, one dressing, costing about £3 per acre has, for practical purposes, completely destroyed all existing thistles. A short report for publication is in preparation. Experiments are being continued and the same chemical is being tried against rushes.

An extended series of plots have been laid down to determine the most effective time and frequency of cutting to destroy creeping thistles in turf.

Seeds Mixtures.—A further series of plots, to determine the values of the chief grass and clover species when used in mixtures under local conditions, in continuation of the trials mentioned in previous reports was laid down. Complete analyses of the hay crops from forty-eight plots of one-eighth acre sown in 1928 were made during the summer. The results of these suggest that very different values may attach to some species in different districts. For example, timothy has, in some places, contributed very materially to the hay while in other areas its produce was practically nil. Cocksfoot also appears more variable than was expected.

Wild White Clover.—The results of several years' trials of strains of New Zealand and British origin are now available, and a report on this investigation is in hand. A careful survey of plots of graded ages distributed over the province was undertaken during the summer and an assessment made, with the collaboration of the county agricultural instructors, of the grazing value of each.

The result of these observations, briefly, was a demonstration that the New Zealand clover was very far behind both English and Irish. This is of immediate importance in Northern Ireland where New Zealand seed has, of recent years, been gaining ground in the markets. Its use cannot be recommended.

Red Clover.—An increased number of plots for the comparison of late flowering red clovers from eight different sources has been laid down in extension of the trials referred to in the previous report. The Montgomeryshire strain is giving evidence of considerable value but these trials are as yet immature.

Turnips.—A preliminary trial of the use of turpentine against turnip "fly" suggests that it may have value. This enquiry will be pursued,

Seed Weight.—Trials are in progress to determine the variation and causes of variability of " bushel weight " in rye-grass and the value of this figure as an indication of quality of seed.

Teaching.—The members of the divisional staff have carried out their usual duties in connexion with the Queen's University department of Agricultural Botany, giving all the classes offered by the University in this subject.

Extra-mural lectures were delivered to Farmers' Union Branches and to a Seed Trade Society.

(b) *Plant Diseases.*

Advisory Work.—The advisory work undertaken in connexion with plant diseases and their control showed considerable increase during 1928–1929. As in 1927–1928 only a small proportion of the specimens received were suffering from attack by the commoner diseases. This means that the troubles dealt with were, in the main, obscure, with the result that a considerably greater portion of the available time has been devoted to advisory work. No special mention need be made of the various species of host plants concerned, the list embraces all agricultural and horticultural crops and includes potatoes, oats, flax, fruit, vegetables, forest trees and decorative plants.

The condition in which specimens for examination and report were received was, on the whole, satisfactory but it must again be emphasized that, if the fullest advice is required in the shortest possible time, the specimens must be received in the laboratory in as fresh and natural a condition as possible. A statement should be sent with the specimens clearly setting out the points upon which information is required and giving some account of the symptoms observed and the growth conditions of the plants under consideration. Although the amount of advisory work dealt with was the largest on record since 1922 there is reason to believe that the fullest use is not yet being made of this service which is at the disposal of all farmers and gardeners.

Potato Diseases.

Ordinary or Late Blight (Phytophthora infestans de Bary).—The study of this disease received further attention during the season, and field experiments were conducted at the Agricultural Research Institute, Hillsborough. Further experiments dealing with the value of dusting the crop with a fungicidal powder as against spraying the crop with a recognized fungicide were carried out and work was commenced in connexion with varietal susceptibility in the field, particularly with regard to the varieties of potato more recently introduced. The question of the possibility of bringing about the immunity of the plant to

the disease by the addition of certain substances to the soil is also under consideration. During the year an account of the work already done in connexion with "Spraying versus Dusting" was published in the Ministry's Journal, and Leaflet No. 50 which deals with the control of potato blight was revised.

Pink Rot (*Phytophthora erythroseptica*. Pethy. and Murphy.)—Considerable advance has been made in the study of this disease both in the laboratory and in the field. Interesting observations were recorded as to the method by which the disease is carried over from season to season, and useful results were obtained in connexion with the environmental conditions which favour the production of resting spores of the fungus. It is hoped shortly to conduct a survey with the object of determining the extent to which the disease normally occurs, and also to investigate the incidence of the disease in crops which have been subjected to flooding during the growing season. It is anticipated that a published account of the work already done will be available during the coming season.

Flax Diseases.

Seedling Blight (*Colletotrichum linicolum* Pethy. and Lafferty.) and *Browning* (*Polyspora lini*. Lafferty.).—Work is still in progress with these two well known seed-borne diseases and particular attention has been given to the possibility of their control by seed treatment. As a result of laboratory tests a promising method is under investigation and it is hoped to extend the work to the field next year.

Oat Diseases.

Oat Smuts (*Ustilago avenae* (Pers.) Jens. and *Ustilago Kolleri*, Wille.).—Considerable time was devoted during the season to the study of these diseases and their control. Facilities for field experiments were put at the disposal of the division by the Trustees of the Research Institute, Hillsborough. Seed treatment trials were conducted using formalin, copper sulphate, sulphur, copper carbonate, and certain proprietary organic mercury compounds. Although definite numerical results have not yet been obtained, interesting observations were made during the season, and the treatment of seed before sowing with an organic mercury compound for the prevention of smut and other fungus diseases is one which promises well. Apart from this method the best results would appear to be given by the formalin treatment, a simple account of which has been prepared during the season and is now available for farmers in the form of a circular published by the Ministry. The reasons for the occurrence of epidemics of oat smuts in certain seasons and in certain localities are not fully understood and experiments designed to throw

further light on this problem are in progress. An attempt is also being made to investigate the susceptibility of oat varieties grown in Northern Ireland to certain strains of the smut fungi.

Leaf Spot (Helminthosporium avenae (Bri. & Cav.) Eid.).—The fungus responsible for this disease has been isolated from diseased plants, and if time permits it is proposed to investigate fully the exact nature of the damage which may be brought about by this disease and the best method of control.

Fruit Diseases.

American Gooseberry Mildew (Sphaerothecam mors-uvae (Schw.) Berk.).—A further series of experiments carried out during 1928–1929 provided results confirming those obtained during previous seasons. Out of the large number of spray fluids used ammonium polysulphide still remains the most effective for those varieties of the gooseberry which are not subject to polysulphide spray injury. For varieties susceptible to this form of spray injury, washing soda is the most efficient substitute. Dusting with very finely ground sulphur has again given excellent results. The satisfactory results obtained in these experiments make it extremely doubtful whether further work of this type on the control of this disease would be profitable and for the present this line of investigation is considered as concluded. An account of the more recent work is being written and it is hoped that it will be ready for publication in the next volume of the Ministry's Journal. Leaflet No. 49 dealing with the control of this disease was revised during the season.

Apple Scab (Venturia inaequalis. Aderh.).—Excellent crops of fruit were again obtained from the commercial orchards in which experiments dealing with the control of apple scab are being carried out. Four years ago it was the rule to find no sprayed trees in these orchards with the exception of those included in the experiments. Now it is difficult to find one unsprayed tree in any of them and all the growers with whom experiments have been placed ask that the number of control (unsprayed) trees included in experimental plots be cut down to a minimum. It is desired here to make mention of the valuable assistance given by the growers in whose orchards this work is being done. The necessity for the regular spraying of apple trees in summer in order to control apple scab is now accepted throughout the country generally and this season has seen a very large increase in the number of sprayed orchards. That the general adoption of control measures has been accomplished in so short a time is in no small measure due to the close co-operation which has existed continually between those engaged in research, the Ministry's Inspectors, the county instructors, and the growers themselves.

In the pursuance of such a problem as the one under consideration the smooth working of such a team has prevented the viewpoint from becoming disproportionate, and has resulted in the recommended measures being presented to the farmers in a form at once applicable and in the shortest possible space of time. Considerable advance has again been made and, although the 2½-8-40 Bordeaux mixture which is being recommended is still giving excellent results, it is probable that a still more efficient mixture will be discovered. Evidence supporting this is already at hand although it is as yet too early to make definite recommendations. Further results have been obtained which should prove useful in controlling the disease and it is hoped that these results will soon be available in the form of a published paper. An account dealing with the work done up to the end of 1927 was published in Vol. II of the Ministry's Journal and the "Spraying Calendar for Apple Trees" (Leaflet No. 33) was revised.

Spring Frosts.—Work in connexion with the prevention of damage to apple blossom by spring frosts was again carried out. The only frost likely to cause serious damage to apple blossom occurred during the early hours of Sunday 21st April and Monday, 22nd April. In the orchard where this problem is under consideration fires, obtained by burning light Diesel oil in lard pails, were lighted in the early morning of Monday, 22nd April. The experimental plot was one acre in extent and it was heated by fifty fires. Each pail contained about two gallons of oil and the fires lasted for approximately three hours. Although useful information of a general nature was obtained, the experiment was insufficiently controlled to allow any definite statement of results to be made, and further complications were added by the grower who, anxious to save his entire crop, set fire to all the inflammable debris upon which he could lay hands. It is, perhaps, worth mentioning that an excellent crop of fruit was obtained from the heated area and that this was the first crop to be taken from these trees which have been planted twenty years.

Winter Spraying.—The possibility of the local manufacture of tar distillate washes was a problem which came up during the year. As a result of discussion co-operation was established with the Chemistry Department of the Queen's University and a number of sprays manufactured locally were tested during the season. Some of these have given very promising results and for the season 1929 proved to be as efficient as those in common use. It is expected that this problem will receive further attention during the coming year.

Demonstrations.—In co-operation with the horticultural inspectors of the Ministry and the county instructors in horticulture, further public demonstrations were arranged in the various

orchards where experiments are in progress. These demonstrations were on the whole satisfactorily attended and proved to be a valuable asset to propaganda work. An exhibit illustrating the work being done in connexion with the control of fruit diseases was staged at the Chrysanthemum Show of the Ulster Horticultural Society during the autumn of 1928. The work in progress dealing with plant disease investigations in general was illustrated by an exhibit at the annual conversazione of the Belfast Naturalists' Field Club held in November, 1928.

Forest Tree Diseases.

Seedling Diseases.—The experimental work dealing with the control of certain seedling diseases of Sitka Spruce and Douglas Fir has now been concluded, and the results obtained were successfully applied on a large scale and over a period of three years. An account of the work has been completed and is being submitted for publication in Vol. III of the Ministry's Journal.

Lectures.—During the season public lectures were given to the Belfast and the Coleraine Naturalists Field Clubs, the Botanic Society of Northern Ireland and branches of the Farmers' Union.

Publications.

"The Sampling of Seeds," by S. P. Mercer. Actes du V.ieme Congres International d'essais de Semences. Rome, 1928.

"The Ryegrass Seed Industry of Northern Ireland," by S. P. Mercer. The Fertilizer, Feeding Stuffs and Farm Supplies Journal XIII 20. 3rd October, 1928.

Agricultural Progress. Vol. VI, 1929.

"Apple Scab and its Control in Northern Ireland," A. E. Muskett and E. Turner. Journal of the Ministry of Agriculture for Northern Ireland, Vol. II, 1929.

"The Control of Ordinary or Late Blight of the Potato in Northern Ireland. Spraying versus Dusting." A. E. Muskett. Ibid.

Plant Breeding Division.

The season 1929 opened auspiciously with early and perfect conditions for sowing which were maintained over a period of about six weeks and so allowed of all the plots being laid down in ideal and very uniform conditions. Sowing was begun in the first few days of March, a month earlier than the previous year. The plots, as a whole, never looked better and gave every promise of bumper yields. Harvesting conditions, however, were miserable

in the extreme. Nearly all the plots were ready to cut in August, but continuous wet weather made their handling a difficult problem. The depredations of small birds must have reduced yields still further.

No public demonstration of cereal or flax work was advertized though there were many visitors to the plots during the summer. The usual guide book was available to all such visitors.

Oats.

The most severe winter experienced since the selection of winter hardy forms commenced was welcomed as being likely to assist very materially in the work of selection. This it undoubtedly did, as many selected lines had their weaknesses exposed, while, on the other hand, some surprisingly good survivals were exhibited. It is uncertain to what extent the position of a row in the cage affected its survival. It seems likely that rows near the wire netting were protected thereby and in turn protected to some extent the neighbouring rows. This possibility complicates further selection until the performance of the selections in different relative positions has been seen. These considerations apart, however, there still remains a number of selections of excellent grain type whose survival could not possibly have depended upon any such external factors. It is now hoped to compare the yields of some of these strains by means of rod row tests.

The material from the same original hybridizations which has been undergoing selection with a view to producing high tillering spring types, and which has been rather disappointing hitherto, revealed distinct possibilities during the past year. These selections have scarcely had fair treatment until this year, being usually last sown and last harvested, generally in an almost unripe condition. In 1929, however, though still last sown, they were sown much earlier than usual and responded well to the better conditions offered.

The replicate row trials were repeated for the third season. It will now be possible to eliminate from these trials the distinctly poorest of the lines included in them, and, in some cases at least, to point to certain strains as being definitely outstanding and so worthy of propagation for field trials.

Twenty-eight varieties of oats were carried to the "garden" plot stage and sixteen to the "field" plot stage of propagation. Twelve varieties were grown at Strabane, as "extension" plots, of varying size according to requirement. New varieties only

entering upon their field trials need not be propagated so extensively as established varieties. Until their merit is proved, only sufficient seed is produced to meet county instructors' requirements for variety trials. Two new Stormont oats were included in these county variety trials this year. The results of the trials are not yet available but the stiff-strawed Black Potato x Victory is reported as having looked well in several districts. The other newcomer, Supreme x Victory, an early-ripening strain, is likely to have its advantages masked in this season of early sowing.

A new threshing machine of a "self-cleaning" type was installed at Stormont and is likely to ease very considerably the pressure just after harvest when the produce of some hundreds of different plots has to be stored or threshed and cleaned as quickly as possible. The new machine threshes and cleans in one operation and is itself easily cleaned. Plots can thus be handled in less than one-third of the time that has hitherto been required.

Flax.

The trial plots which form the basis of the flax work were very successfully carried through this season. Propagation work was also particularly successful at Stormont and some high rates of increase are anticipated. In England the abnormal drought stunted the crop and no doubt has depressed the seed yields to some extent but not sufficiently to cause any danger of a check to the smooth working of the propagation scheme.

Animal Diseases Division.

During the year 16,155 specimens were received in the division, compared with 4,712 in the previous year. Of these, no less than 15,520 were received in connexion with the scheme of testing for bacillary white diarrhoea.

Bovine Diseases.—Investigations regarding contagious abortion and sterility were continued during the year. There can be little doubt that the former disease constitutes the most serious problem confronting cattle-owners. It was pointed out in the last annual report that the examination of barren animals in county Fermanagh had shown only a small proportion to be affected with the ordinary type of abortion caused by Bang's bacillus. A further survey during the year under review had similar results, only 8 out of 71 cows giving a positive reaction to the blood test for abortion. Herds were encountered, however, where several animals had "slipped" their calves although all subsequently passed the blood test. The circumstantial evidence pointed to these abortions being of a contagious nature and the possibility that specific agents other than Bang's bacillus are operative in

these cases is now being examined. The most probable cause would appear to be a germ known as *Vibrio fetus* and all blood samples received by the division will in future be tested for this organism. Any positive results would have an important bearing not only on the causation of these obscure abortions but also on the variable success attending the use of vaccines composed of Bang's bacillus.

Examination of barren cows over a wide area gave similar results to those of last year. Barrenness was found to occur chiefly in spring calvers, which failed to hold to repeated services till October or November. The actual cause and the successful treatment of the condition have been described in previous annual reports. While it is known that contagious abortion, retention of the afterbirth and lack of cleanliness at calving, all predispose an animal to sterility, it may be safely assumed that under-feeding plays an important part in lowering the body resistance. This applies especially to cows which carry their calves throughout the winter and are milked to within a few weeks of calving. Many breeders hold the view that barrenness is infectious in nature and that the bull can carry infection from a diseased to a healthy cow. While this point remains undecided, the division has strongly advised the disinfection of bulls after each service. Bacteriological research on sterility was greatly hampered by a lack of suitable material for examination and the results obtained were insufficient to draw any conclusions. In order that the germs which cause sterility may be identified, it is essential that wombs from cows should be available at the onset of barrenness. Barren cows which have been fattened do not furnish suitable material as the wombs show only the effect of infection and not the actual infection itself.

Towards the close of the year a questionnaire covering the major aspects of sterility and contagious abortion was sent to all veterinary surgeons in Northern Ireland. The replies are now being collated and it is hoped that valuable information will emerge.

Results of examination of bovine specimens :—

<i>Disease.</i>	<i>Positive.</i>	<i>Negative.</i>	<i>Total</i>
Tuberculosis, Milk Samples ..	20	125	145
Tuberculosis, Other Specimens	4	15	19
Contagious Abortion, Blood			
Samples	89	198	287
Anthrax	1	8	9
Miscellaneous	—	—	62
Total			522

These figures show that 16.0 per cent. of the milk samples which were submitted under the Bovine Tuberculosis Order, as suspected of containing tubercle bacillus, were found to be so affected.

620 doses of vaccines, chiefly for contagious abortion and felon, were manufactured during the year.

Poultry Diseases.—During the year the Ministry introduced a more comprehensive scheme of blood testing for bacillary white diarrhoea with a view to establishing and maintaining freedom from this disease on all poultry stations coming under the Ministry's schemes. The scheme provides for (1) the compulsory testing of all trap nesting stations and of ordinary station flocks where the disease has been confirmed, and (2) the voluntary testing of breeding stocks belonging to competitors at the Ministry's laying test at Stormont. The ultimate object is to make testing compulsory in the cases of all poultry stations connected with the poultry schemes of the Ministry and county committees. Full particulars of the scheme will be found in the appendices.

It is quite evident that Northern Ireland is not so badly affected by this disease as other parts of the United Kingdom. At the same time there are obvious indications that the disease is being spread, mainly, it is to be feared, by the purchase of day-old chicks, etc. from cross-Channel breeders. It is for this reason that the Ministry has decided to insist upon the testing of stock at all stations coming within the Ministry's scheme and to prohibit the introduction of stock to such stations unless the stock has been obtained from a source approved by the Ministry.

In this connexion, private breeders should realize the absolute necessity of disposing immediately of all birds reacting to the bacillary white diarrhoea test. The majority of private breeders are content with a single flock test, which gives a false sense of security, and those who do submit their birds to a second test frequently retain those which have reacted to the first test, apparently in the hope that they will pass next time. No breeder adopting such a policy can hope to clear his flock from the scourge of bacillary white diarrhoea. The records of the division show beyond question that where reactors were retained there was little difference in the percentage of carriers found at the first and subsequent tests. On the other hand, where such birds were immediately eliminated excellent results were obtained.

Threadlike worms (*Trichosoma*) were responsible for a high mortality in turkeys. This cause was not previously known to be operative in Northern Ireland. The worms, which inhabit the intestines, resemble very fine hairs and are not easily discernible by lay observers.

Research work was continued on improved methods of detecting bacillary white diarrhoea in chicks and in adult birds. Specimens received for examination are frequently very decomposed and any bacillary white diarrhoea bacilli present are masked by putrefactive organisms. Similarly attempts to recognize the former in bowel contents and in droppings are complicated by the presence of abundant intestinal germs. A method was evolved by which the bacillary white diarrhoea bacillus can be grown in purity and contaminating organisms suppressed. The method has enabled important information to be gained regarding the viability of the bacillary white diarrhoea bacillus outside the body. A paper on the subject is in course of preparation.

Much time was also devoted to an investigation of the many problems which enter into blood-testing for bacillary white diarrhoea. At present there is no standard test which is internationally accepted, each laboratory having its own method of testing. A comparative study was made of the methods employed by other workers and marked variations in the results were obtained. The work is not yet completed, but an interim report will be published next year.

The experiments outlined in the last report to ascertain the method of spread of bacillary white diarrhoea amongst adult birds were continued.

Sheep Diseases.—Only 29 specimens were received including 7 wool samples affected with sheep scab. Although the weather conditions were conducive to the prevalence of liver fluke, no undue losses were experienced as farmers are now well acquainted with the methods of control advised by the division. Similarly vaccination against braxy has become the general practice and the disease has ceased to be an important cause of losses.

Research work on "headles" entered on its third season. Investigations during the year showed that the disease is widespread in Northern Ireland and is not confined to the Antrim hills as was at first thought. While the owners of affected flocks were unanimous that the disease is a form of plant poisoning, there was marked disagreement regarding the plant held to be responsible. Suspected plants were again fed to healthy blackface lambs while exposed to sunlight but negative results were obtained. Bacteriological examination of affected animals failed to reveal any causal organism. The weight of evidence points to "headles" as being caused by a plant with photodynamic properties which renders the skin susceptible to the action of sunlight.

The botanical surveys in connexion with this investigation were carried out by the head of the Seed-testing and Plant Disease Division.

Research work was commenced regarding a disease known in county Armagh as "Winnow-blind," which attacks sheep during the late summer.

Pig Diseases.—14 specimens were submitted for examination, including one case of swine erysipelas. Research work on pig diseases was suspended pending the completion of piggeries now in course of erection.

Miscellaneous Diseases.—69 specimens representing diseases of horses, dogs, cats and rabbits were received. One case of suspected rabies gave a negative result.

General.—The staff has continued to be responsible for the teaching of veterinary hygiene in connexion with the Queen's University of Belfast.

7 lectures and 13 demonstrations of the various diseases of animals were given to veterinary surgeons and farmers.

On the invitation of the Medical Research Council, the head of the division acted as an executive member of the Editorial Committee responsible for the preparation of their System of Bacteriology.

Publications :—

1. "Neoplasms in the fowl." By W. R. Kerr, *Veterinary Journal*, Vol. LXXXIV, 1928.
2. "Blows in pigs." By H. G. Lamont. *Journal of Ministry of Agriculture, Northern Ireland*. Vol. II, 1929.
3. "Arsenical poisoning." By H. G. Lamont. *Veterinary Journal*. Vol. LXXXV, 1929.
4. "The rook as a source of gapeworm infection." By J. P. Rice. *Journal of Ministry of Agriculture, Northern Ireland*. Vol. II, 1929.
5. "Fowl Plague." By J. P. Rice. *System of Bacteriology*. Medical Research Council. Vol. VII, 1929.

Poultry Division.

The feeding experiments with laying birds hitherto carried out at Stormont were discontinued during the year under review as this work is now being undertaken at the Empire Marketing Board's Poultry Research Station at Hillsborough.

Feeding Experiment with Growing Chicks.—During the year a feeding experiment involving six groups of chickens was carried out. This experiment was a duplicate of one which was conducted at the Empire Marketing Board's Poultry Research Station at Hillsborough in 1928, and was designed to investigate the value of mineral and protein supplements in rations for chicks, and to

attempt to find a ration which will take the place of separated milk. The records of the rates of growth amply confirmed the results obtained in the previous year's experiment at Hillsborough. (Annual Report for 1927-28, page 26).

Representative birds from each group were exhibited at the Royal Ulster Agricultural Society's annual show in May, 1929, and were a source of great interest to visiting farmers and poultry keepers.

The demonstration experiments with laying hens were continued, and birds and results were again exhibited at the Royal Ulster Agricultural Society's show.

Laying Test.—The Ministry's seventh Stormont laying test finished on 16th September. There were 101 pens in the test each containing six pullets, an increase of 10 pens over the previous year.

The results of the test were, on the whole, satisfactory. There was a slight decrease in the average number of eggs laid per pullet, but this was due to a few pens of very poor layers and to the very severe weather during the winter months. The frost and cold winds had an adverse affect on egg production generally; White Leghorns being affected more than birds of the heavy breeds. The very marked improvement in the size of the eggs was one of the most pleasing features of the test. Out of a total of 101 pens, 20, or 19.8 per cent., were disqualified for producing 300 or more second grade eggs, whereas in the previous test 27 pens out of a total of 91, or 29.6 per cent., were disqualified.

The silver cup presented by the Ministry for the pen of pullets in the test laying eggs of the highest market value, the Ministry's winter egg prize and the silver cup presented by the Scientific Poultry Breeders' Association were awarded to a pen of White Wyandottes, the property of a county Down farmer. The silver medal for the best pullet in the test was also won by a White Wyandotte, with a score of 263 first grade eggs. Thus for the third year in succession the White Wyandottes have proved superior to the other breeds in the test.

It was considered advisable to alter the method of recording from that of previous years, and for the 1928-29 test an individual record was kept of the number, weight and value of all eggs laid. The weighing and recording of each egg entailed a good deal of extra labour, but it has made it possible to give very detailed records of each bird's performance to the respective owners. This information should be invaluable in the selection of birds for breeding pens.

The following table shows the number of pens from each county entered in the tests for the past seven years :—

	1922-23 Pens.	1923-24 Pens.	1924-25 Pens.	1925-26 Pens.	1926-27 Pens.	1927-28 Pens.	1928-29 Pens.
Antrim	3	16	17	11	13	22	20
Armagh	9	12	19	19	10	10	9
Down	23	34	24	29	24	32	42
Fermanagh ..	1	2	2	2	4	5	6
Londonderry ..	3	2	3	2	5	10	10
Tyrone	6	5	7	8	16	12	14
TOTALS ..	45	71	72	71	72	91	101

Particulars of eggs laid, value of eggs, cost of food and gross return over cost of food in respect of each of the seven tests carried out by the Ministry are given below :—

48 weeks ended	No. of pullets penned.	No. of eggs laid.	Average No. of eggs per bird.	Average value of eggs per bird.	Cost of food per bird.	Average price of eggs per dozen.	Gross return per bird over cost of food.
			s. d.	s. d.	s. d.	s. d.	s. d.
16th Sept., 1923	270	51,025	188.98	32 6.9	9 10	2 0.8	22 8.9
15th Sept., 1924	426	77,383	181.6	33 0.5	9 10.25	2 2	23 2.25
16th Sept., 1925	432	78,565	181.86	31 10.7	10 1.6	2 1.2	21 9.1
16th Sept., 1926	426	80,798	189.66	30 6.64	10 1.8	1 11.1	20 4.84
16th Sept., 1927	432	81,732	189.19	26 9.2	10 2.2	1 8.3	16 7
15th Sept., 1928	546	100,378	183.84	26 4.28	10 2.1	1 8.64	16 2.18
16th Sept., 1929	606	109,970	181.47	27 9	11 0.25	1 10	16 8.75

Preparations have been made for the eighth test which will commence on 16th October, 1929.

World's Poultry Congress and Exhibition, 1930.—The Fourth World's Poultry Congress and Exhibition will be held at the Crystal Palace, London, in July, 1930. These Congresses are held triennially, and are sponsored by the World's Poultry Science Association whose members are drawn from all parts of the world and whose principal object is the advancement of all aspects of the poultry industry. The scope of the Congress and Exhibition embraces the staging of educational exhibits illustrating the development of poultry-keeping, the results of investigational work in connexion with the industry and the methods of marketing adopted by the participating countries; the exhibition of pens of live birds by breeders, and the display by merchants and traders of commercial and trade exhibits of dead poultry, eggs, other poultry products, poultry appliances, feeding stuffs, and other commodities.

These Congresses provide an excellent opportunity for advertising the quality of poultry, eggs, etc., and it will be in the best interests of poultry breeders, traders and merchants of Northern Ireland to have representative exhibits at the Congress in 1930. The Ministry will arrange the educational exhibits which, apart from the Marketing Section, will be staged in conjunction with the British National Exhibit. These exhibits will be designed to illustrate poultry development in Northern Ireland and also the application of the results of research work to practical poultry husbandry. In the Marketing Section the exhibits will emphasize the main features of the Marketing of Eggs Act and show the effects of this measure in developing the egg export trade. The trade in dead poultry will also be stressed and suitable exhibits displayed. A separate section for the exhibition of live birds, pigeons and rabbits from Northern Ireland breeders will be provided, and it is anticipated that about fifty entries will be forthcoming. The Congress will also provide a valuable opportunity of extending trade, whether it be in eggs, dead poultry, or poultry appliances, and it is gratifying to record that the Northern Ireland traders have decided to stage an exhibit.

Each country participating in the Congress has appointed a National Committee to organize its representation at the Congress and to act as a connecting link with the organization in London. The personnel of the National Committee for Northern Ireland is as follows :—

Chairman : James S. Gordon, C.B.E., D.Sc.

J. Adams.

J. Getty, A.R.C.Sc.I., N.D.A.

T. Gracey.

J. Pimlott, O.B.E., F.H.A.S.

J. H. Prentice, B.Sc.

Captain J. P. Rice, B.Sc., M.R.C.V.S.

J. G. Rhynehart, F.R.C.Sc.I., D.I.C., N.D.A.

Miss J. E. Scott.

G. S. Robertson, D.Sc., F.I.C.

Miss M. J. Sheedy.

Sydney Smith.

A. W. Steen, M.A., B.Sc., A.R.C.Sc.I.

Miss H. C. Walker.

W. C. Glover, M.B.E. (*Secretary*.)

During the month of April conferences were held with representatives of the trade, the Northern Ireland Utility Poultry Society, the Irish Fanciers' Association, and with the Instructors in Poultry-keeping, to discuss the question of exhibits in the Trade Exhibits and Live Stock Sections of the Congress.

Agricultural Research Institute of Northern Ireland.

The Ministry has to record, with deep regret the death of Mr.

Josias Cunningham, one of the Ministry's original representatives on the Board of Trustees of the Institute. Mr. Cunningham took a keen and active interest in the work of the Research Station at Hillsborough and his services and wide experience were of great assistance in connexion with the initial organizing work of the station. The Ministry has appointed Sir Basil Brooke, Bart., to fill the vacancy caused by Mr. Cunningham's death.

In accordance with the provisions of the Agricultural Research Station Act, Mr. James Pimlott, O.B.E., ceased to represent the Ministry on his retirement from the civil service on 1st October, 1928. The Ministry has re-appointed Mr. Pimlott as one of its representatives on the Board of Trustees.

7. SPECIAL HORTICULTURAL EXPERIMENTS.

Black Currant Mite.—The experiments which were in progress at two centres in 1927–28 gave promising results and were continued. In the event of results being again satisfactory it will be possible to arrive at more definite conclusions regarding the effectiveness of the treatment given, and in order that the results might be capable of more general application arrangements were made to have the experiment duplicated at other centres during the year.

Capsid Bug Experiments.—Apple Trees.—Two additional plots were included in the experiment with the object of testing the effect of a combined spray of (a) nicotine and Bordeaux mixture, and (b) nicotine sulphate and Bordeaux mixture on trees of the variety Grenadier. The crop of fruit this year on all the plots was under the average and, as in previous years, the largest crop of fruit free from capsid injury was produced on the trees sprayed with nicotine and soft soap.

Capsid Bug and Apple Scab Experiments.—Satisfactory results continue to be obtained from these experiments with a combined spray on "Bramley's Seedling" and "Lane's Prince Albert." The owner of the orchards in which these experiments, were carried out decided, as the results were so promising, to instal an engine driven pump on account of its much speedier action in place of the "manual" pump used during previous seasons. This pump was put into operation during the spring and necessitated the re-arrangement of the experimental plots, but the main features were maintained. With the exception of the control trees the rest of the trees in the orchard were sprayed with Bordeaux mixture and nicotine. On one plot the manual pump was used during the whole season, the power pump being utilized for all other plots. The 1929 crop was the best ever produced in this orchard. The fruit on the plot sprayed by the manual pump was not as free

from blemish as that on the trees sprayed by the power pump, indicating that the best results are obtained when the spray is applied under high pressure.

The power pump was worked throughout the season at a pressure of not less than 200 lb. per square inch. Three applications were made during May and June at the periods recommended in Leaflet No. 33, "Spraying Calendar for Apple Orchards."

Ovicidal or Egg Killing Washes.—Sixteen different brands of tar oil washes were included in the 1928–29 tests and the cleansing effect of these different sprays on the trees was noted. It was observed that in the plots under experiment and to some extent in other orchards the severe frosts in late spring destroyed large numbers of the nymphs of apple sucker. This had the effect of somewhat masking the effectiveness of the tar distillate washes used in the experiments. The tests will be continued with a view to obtaining definite results as to the most satisfactory brands on the market.

8. MARKETING.

Eggs.

The legislation on the subject of the marking of eggs, to which reference was made in the report for last year, is now in force. An Imperial Order in Council under the Merchandise Marks Act, 1926, was promulgated on the 21st December, 1928, and provided, *inter alia*, that, as from the 21st April, 1929, all eggs imported into the United Kingdom should be marked on the shell with an indication of origin. The mark could take the form of the word "Empire" or "Foreign," as the case may be, or a definite indication of the country of origin.

Concurrently the provisions of the Agricultural Produce (Grading and Marking) Act, 1928, and the Marketing of Eggs (Northern Ireland) Act, 1928, relating to the marking of cold stored and chemically stored eggs came into force and required that British eggs cold stored or chemically stored in the United Kingdom should be marked with the words "cold-stored" or "chilled" or "sterilised."

As regards preserved eggs it was required that as from the 28th February, 1929, *all* preserved eggs—that is eggs preserved by processes, such as lime, waterglass, oil, etc., should at the time of sale or exposure for sale be marked with the word "preserved." As distinct from the conditions applicable to cold-stored or chemically stored eggs this marking applied to preserved eggs whether imported or home produced.

The coming into operation of the marking of imported eggs

was followed immediately by a remarkable increase in the demand for unmarked eggs and by a new orientation of market values of eggs from various countries. Though the difference between the prices returned for home produced eggs and those for the best imported eggs narrowed somewhat after the first few weeks it was emphatically demonstrated that the public preferred the home produced article and were willing to pay a good price for it.

So far as the Northern Ireland industry was concerned the first manifestation of the effect of marking was a sudden rise in prices which was unseasonal and which continued to a point not altogether justified by the state of the market. There were grounds for believing that the rise was due in part to speculative buying by distributors in Great Britain and the result was that many had very considerable stocks in hand when, as was inevitable, the price broke. The difficulty of selling these eggs on a falling market led to many complaints as to quality, the responsibility for which could not be laid at the door of Northern Ireland exporters but which nevertheless injured the trade reputation of Northern Ireland eggs.

In time, however, more stable conditions were resumed and it was possible to form some idea of the problems the new order of marketing had brought in its train. One certainty emerged—the necessity for the utmost care to ensure a uniform high standard of quality. Unmarked eggs were naturally the subject of comparison with imported eggs and unless the quality justifies the difference in price which the public is prepared to pay the marking of imported eggs might well prove a boomerang.

Added weight was given to the importance of standardization in preparing consignments for cross-channel markets by the incorporation in regulations, applicable to the trade in eggs under the National Mark in Great Britain, of conditions relating to cleanliness, uniform grading and packing similar to those in force in Northern Ireland.

The precise effect of the provisions relating to the marking of cold stored eggs can not be determined until the season for withdrawal is further advanced. Imported cold stored eggs need bear the mark of origin only, whereas home produced cold stored eggs must be marked as such. How far the suspicion that an imported egg may be cold stored will influence consumers in favour of the home produced article has yet to be proved, but the Ministry is satisfied that in the end the policy of giving the consumer the fullest information as to the quality of eggs will be rewarded. There was, in the past, much fraud practised in connexion with cold stored eggs to the detriment of the trade reputation of fresh eggs during the winter season. In future, however, misdescription is possible only in terms of imported eggs.

In face of the uncertainty of this year's market Northern Ireland merchants adopted a cautious policy and deposits in Northern Ireland cold stores this year show a decline of approximately 50 per cent. on the figures for 1928. The bulk of the storing was done at a later stage than was usual in previous years owing to the abnormal demand for fresh eggs at the inception of the marketing arrangements.

Revision of Marketing of Eggs Rules.—The Marketing of Eggs Act (Northern Ireland), 1928, left certain conditions to be prescribed by regulation and these were incorporated in the Marketing of Eggs Rules (Northern Ireland), 1929, issued on the 28th February, 1929. The Ministry took advantage of the occasion to include in the Rules certain revisions which had proved by experience to be desirable. Details of the more important amendments are as follows :—

Premises.—Greater emphasis was laid on the suitability of premises. The conditions for the recognition of premises used by the "shipper" class were extended to include not only adequate facilities in the way of premises and equipment but also evidence of ability on the part of the staff to carry out the processes of testing, grading and packing. By the loss of his certificate of recognition of premises a wholesale dealer may now be confined to a "collection" trade which means that he may not grade, test and pack eggs for sale wholesale, but must pass on supplies collected by him to other merchants who are in a position to perform these operations in strict conformity with the regulations. This arrangement has the merit that it does not necessarily disturb the commercial relations between the wholesale dealer and his suppliers—an important matter when it is remembered that they usually purchase other commodities from him.

Second Quality Eggs.—It had become apparent that strict compliance with the Ministry's requirements in regard to the quality of eggs to be sold by wholesale entailed rejection of eggs which, while not fresh, were still fit for immediate consumption. It was considered desirable, however, in view of changed conditions in the British markets, that eggs with even minor blemishes should not be included in cases of "Fresh" or "New Laid" eggs and it was accordingly provided that second quality eggs could be sold by wholesale provided the word "Seconds" was stamped on the shell and the case containing the eggs conspicuously marked with the same word. It was made an offence to include eggs of second quality in any case of graded and tested "fresh" eggs.

Identification of Supplies.—An extension of the scope of the Ministry's supervision over the industry was made possible by the inclusion of a condition which required all wholesale dealers

and collectors to keep such a record of the receipt of their supplies as would enable them to prove to the satisfaction of the Ministry the identity of the person from whom any particular lot of eggs had been received. This condition applies only during the testing season, viz., 1st May to 31st December. A leaflet describing a simple method of identification was distributed amongst all wholesale dealers.

Cases.—The Ministry felt that insistence on the use of new cases for the carriage of eggs within Northern Ireland was no longer justified and it was prescribed that the case used for this purpose may have been used before, but must be clean and in good order generally.

Minor alterations were also made in the specification for the construction of the cubicle case in order to improve its carrying qualities. To meet the growing preference for the use of this type of case a special large sized cubicle case was prescribed for eggs of the "Special (17 lb.)" grade.

Dating of Cases.—The Ministry has frequently been at a loss to fix the responsibility for unsatisfactory quality by reason of the fact that evidence was lacking as to the date when the case in question was despatched from the premises of the wholesale dealer. To put the date in plain figures opened the door to fraud and it was decided to adopt a simple code which conceals effectively its purport to any person not in possession of the key.

Grades.—It was decided, in order to conform to the ruling practice in the British market, to prescribe special designations for Northern Ireland grades. The names selected are as follows:—

- " Special (18 lb.) "
- " Special (17 lb.) "
- " Standard (15½ lb.) "
- " Selected (14 lb.) "
- " Smalls."
- " Ducks."

These names are used in quoting for orders, entered in the invoice and marked on the boxes.

Compliance with the Rules.—Having regard to all the circumstances, the general standard of quality during the year was satisfactory. There were periods when little criticism could be made, but the temporary accumulation of unsold stocks during a slump in prices was always accompanied by a general falling off in quality. It becomes more apparent that testing is a skilled job and increased efficiency on the part of the tester is the most promising line of approach to improved quality. The Ministry devoted considerable attention to the training of testers during the year.

The system of identification of supplies was an innovation of such a novel character in Northern Ireland that perfection in its execution was not expected. It has, however, proved its worth and has enabled the Ministry to exercise a closer supervision over the quality of eggs as they are marketed by producers.

Absolute perfection in grading has not yet been attained, but the fact that the regulations in Great Britain for the preparation for sale of "National Mark" eggs place special emphasis on uniformity has strengthened the Ministry's hand in administering the rules on this point.

It is satisfactory to record improved cleanliness generally. On very few occasions was it necessary to take disciplinary action in regard to this matter.

Inspection in Transit.—The importance of this feature of the Ministry's work increased during the year and considerable time was devoted to it. Serious infringements of the Rules observed in several instances were made the basis of legal proceedings against the consignors.

It became necessary to extend the Ministry's scheme of inspection during the year and the preliminary arrangements for making Newry an inspection centre were put in hand.

General.—The development of the wholesale trade in eggs in Northern Ireland since 1924 has been accompanied by a steady increase in the number of licences taken out. There are now approximately 2,300 licence holders. Competition for supplies has had the effect of reducing the quantities brought for sale to country markets—the direct result apparently of the extension of the operations of itinerant collectors. This trend towards decentralization made it more difficult to ensure that such matters as purchase by weight were properly complied with. Thanks, however, to the assistance of the Royal Ulster Constabulary the Ministry was able to take proceedings for non-observance of this regulation in a few instances.

Dairy Produce.

Reference to other sections of this report will show that the agencies through which the Ministry works to foster the development of the dairy industry are of a surprising variety. The Live Stock Breeding Act, research in connexion with feeding for milk production and with the improvement of pastures, the encouragement of milk recording and of the registration of dairy cattle, the award of premiums for high class sires and of subsidies to agricultural show societies, all—either specifically or as part of a work of wider significance—have as a common object the development of the live stock industry. Of this industry the

butter trade is so important a subsidiary that unless it is made to yield the maximum return to the agricultural community much of the energy devoted to the improvement of live stock is dissipated.

Under the Ministry's scheme of itinerant instruction in butter-making, advice in home butter-making is made available, but a commodity which is produced in small quantities and under so many varying conditions cannot be expected to be uniformly good.

Creamery butter offers wider possibilities of improvement. The organizations working under the Ministry's scheme of instruction have always been assured of the Ministry's advice and assistance in solving their problems of production and marketing. There are, however, weaknesses in the creamery system which seriously hamper development. Much excellent butter is produced, but uniformity of quality has not so far been possible. The underlying reasons are varying conditions in connexion with premises, plant, working methods, milk supply, etc.

Marketing of Dairy Produce Bill.

Proposals for better organization of the industry were under consideration for some time and a definite stage was marked by the introduction of the Marketing of Dairy Produce Bill in the House of Commons on the 4th July last. In brief the main provisions are as follows :—

Registration of Premises.—Premises used for the purposes of a central creamery, an auxiliary creamery, a butter factory or for wholesale dealings in butter must be registered. The conditions of registration include suitability of premises, machinery, utensils, availability of good water supply, maintenance of proper conditions of hygiene, employment of qualified staff, reservation of premises solely for purposes of the registered business.

Provisional registration pending the completion of necessary improvements may be granted by the Ministry.

The cancellation of registration, which of course entails prohibition of the use of the premises for the production of butter, is provided for, and broadly speaking the registration may be cancelled for any breach of the conditions of registration or for contravention of the other provisions of the Bill.

Licences.—Consignments of butter or cream may be forwarded to Great Britain, the Irish Free State or the Isle of Man only under licence. The standards of quality to which butter and cream must conform, the types of containers, the quantity and

quality of material to be used in packing, the method of packing and the manner in which the packages are to be marked will be prescribed by rules and a licence may be withdrawn for contravention of these rules or for infringement of the other provisions of the Bill. A special condition of the issue of a licence is the duty of the licence holder to forward samples to any centre for the purpose of inspection.

Adulterants, Unclean Milk, Moisture in Butter.—To have in any registered premises any substance intended to be used for the adulteration of butter or cream or to have on the premises any butter or cream containing any adulterant will be an offence.

To offer or supply to a registered central or auxiliary creamery any unclean, contaminated or stale milk or milk contained in a vessel which is dirty or internally rusty will be an offence, as is also the acceptance by the creamery of such milk.

To have on the registered premises or to consign from the registered premises butter containing more than 16 per cent. water will be an offence, unless it is proved that the butter was not made, blended, re-worked or treated on the premises.

Inspection and Sampling.—Powers of examination and sampling which apply to all phases of the industry are provided for.

Records.—The occupier of registered premises will be required to keep records and furnish returns in relation to the prices of butter made; the receipt, despatch, transit and delivery of butter, milk and cream dealt with on the registered premises, as well as the number of persons from whom milk is received, and to permit the inspection or the taking of extracts by the Ministry's officers from the records.

"Creamery".—The word "Creamery" or any colourable imitation thereof may not in future be applied or used in connexion with any premises not registered under the Act, and the designation "creamery butter" is confined for use in connexion with the butter made at a central creamery in Northern Ireland.

Fruit.

That fruit farming in Northern Ireland is not more prosperous cannot be attributed merely to its comparatively modest dimensions. True, in markets supplied with such vast quantities of imported produce forwarded in most instances by powerful organizations capable of exerting wide influences on market conditions—the "small man" often finds it difficult to sell his crop to advantage. His difficulties are, however, not

decreased if he ignores—as it is feared many Northern Ireland fruit farmers do ignore—the requirements of the market.

Overseas supplies reach the United Kingdom in consignments in the preparation of which the principle of standardization has been developed to a high degree. In respect of any particular class of fruit the packing case is stereotyped and the fruit is uniform in colour, size and quality. As a result traders right along from the port to the consumer are able to handle the produce with a minimum of expenditure of time and labour, and with the confidence that the commodity accords with the description quoted by the forwarding agencies.

For some time past the question of the desirability of introducing improved methods of marketing for Northern Ireland fruit have been actively canvassed by the interests concerned. Involved in the question, however, was the difficulty of the disposal of fruit of second and third grade quality, and of the improvement in crop management to minimize the proportion of fruit of this quality produced.

The need for legislation having been emphasized by representatives of those interested in the trade the Ministry drew up proposals for inclusion in a draft Bill, to be introduced into Parliament at some future date. These proposals were discussed by the Ministry's Advisory Committee on Fruit and agreement on general principles was reached in regard to the licensing of persons engaged in the export business, and the prescribing of conditions to be observed in the marketing of fruit.

Marketing Assistance.

Advantage was again taken of the splendid opportunity afforded in connexion with the British Industries Fair and the Ideal Homes Exhibition held in London in the spring of the year for giving publicity to Northern Ireland agricultural produce. With the assistance of the Empire Marketing Board and in co-operation with the Ministry of Commerce, the Ministry staged at these Exhibitions displays of eggs, bacon, hams and other agricultural produce from Northern Ireland. Representatives of the Ministry attended to deal with trade enquiries and a substantial volume of new business was secured.

Exhibits were also staged at a number of other centres in Great Britain and, of these, the displays of Northern Ireland potatoes at the Imperial Fruit Show held in Manchester, the Empire Exhibition in Cardiff and the Smithfield Club Show in London, met with considerable success.

Every possible assistance in obtaining markets for their produce was afforded to exporters and as a result many merchants were brought into touch with reliable cross-Channel buyers.

Railway Rates and Transit.

During the year many instances of damage and delay in transit were brought to the notice of the carrying companies who rendered every practicable assistance in the investigation of these complaints. In a number of instances the Ministry's efforts resulted in the satisfactory settlement of claims submitted to the companies by traders for losses sustained and on every occasion on which representation was made the carrying companies expressed their readiness to facilitate the transit of Northern Ireland agricultural produce and to take special steps to ensure the safe and expeditious conveyance of consignments.

As a result of representations made by the Ministry, concessions were granted by the companies in the rates for the carriage of (a) apples from Magherafelt, Desertmartin, Limavady and Maghera to Belfast, and (b) potatoes from Magherafelt, Desertmartin, Ballymena, Coleraine, Limavady and Cookstown to Birmingham and Wolverhampton.

Merchandise Marks.

Up to the present applications under the provisions of the Merchandise Marks Act, 1926, for the marking of the following agricultural commodities have been considered by the Standing Committee :—

- (i) Honey ; (ii) Fresh Apples ; (iii) Eggs in Shell and Dried Eggs ; (iv) Currants, Sultanas and Raisins ; (v) Oats and Oat Products ; (vi) Tomatoes ; (vii) Rose Trees.

The Report of the Standing Committee in regard to the applications in respect of the above-named commodities was considered by the appropriate department and Orders in Council were made requiring

(a) the marking on exposure for sale wholesale and by retail and on sale wholesale and by retail in the United Kingdom of any imported honey or any blend or mixture of honeys of which imported honey forms part ; the marking on sale or exposure for sale in the United Kingdom of imported rose trees.

(b) the marking on importation ; on exposure for sale wholesale and by retail, and on sale wholesale and by retail in the United Kingdom of (1) imported currants, sultanas and

raisins ; (2) eggs in shell, dried eggs ; (3) oat products, and (4) fresh apples. In (1), (3) and (4) marking on sale is not required in the case of quantities of 14 lb. or less ; and further, so far as currants, sultanas and raisins are concerned, marking on exposure for sale by retail is not required in the case of packages made up for sale on the premises of a retailer ; as regards dried eggs marking on exposure for sale by retail and on sale by retail is required only in the case of packages which are made up before reaching the retailer.

The Orders in Council in regard to (a) became effective in Great Britain and Northern Ireland as regards " honey " from the 13th January, 1929, and as regards " rose trees " from the 7th August, 1929.

The Orders in Council in regard to (b) became effective as regards " eggs in shell " from the 21st April, 1929 ; as regards " dried eggs " from the 21st March, 1929 ; as regards " currants, sultanas and raisins " from the 21st June 1929, except on the importation of these products, when the Order became effective from 21st April, 1929 ; as regards " oat products " from 21st June, 1929, except on importation when the Order became effective from 21st April, 1929, and as regards fresh apples from 13th November, 1928.

An application for an Order in Council to require the marking of imported tomatoes was submitted to the Standing Committee for consideration and the Committee in its report of the enquiry held on the 22nd March, 1929, recommended that :

" An Order in Council should be made prohibiting the importation of raw tomatoes or the exposure for sale wholesale or sale wholesale of imported raw tomatoes unless each container bears an indication of origin as defined by the Act ; and the exposure of imported raw tomatoes for sale by retail unless they bear an indication of origin."

This recommendation is still under consideration.

Sale of Food and Drugs Acts, 1875 to 1907.

During the year ended 30th June, 1929, 4,792 samples of milk, buttermilk, butter, margarine and cheese were taken by local inspectors under the Acts as compared with 4,506 samples taken during the previous twelve months. 187 prosecutions were instituted and 120 convictions obtained, the fines amounting to £134. 1s. 6d., the corresponding figures for the twelve months ended 30th June, 1928, being prosecutions, 170 ; convictions, 120 ; and amount of fines, £208 17s. 2d.

The following are particulars in regard to the samples taken by local inspectors in the year ended 30th June, 1929 :—

Nature of sample.	Number of samples taken.	Number of prosecutions	Number of convictions	Penalties imposed (exclusive of costs)
Milk	2,715	112	52	£59 2 0
Buttermilk	505	46	41	51 13 6
Butter	957	28	26	22 10 0
Margarine	348	1	1	0 16 0
Cheese	267	—	—	—
Totals	4,792	187	120	£134 1 6

Five new premises in the county borough of Belfast were registered during the year under Section 9 of the Margarine Act, 1887, and section 7 (4) of the Sale of Food and Drugs Act, 1899, for wholesale dealings in margarine. As no registrations were cancelled during the year under review there was, on the 30th June, 1929, a total of 157 registered premises in Northern Ireland.

The present distribution of such premises is as follows :—

County Borough of Belfast ..	117
County Borough of Londonderry ..	10
County Antrim	11*
County Armagh	7
County Down	6
County Fermanagh	1
County Londonderry	2
County Tyrone	3

* Includes one margarine cheese factory.

No additional premises were registered as butter factories under section 1 of the Butter and Margarine Act, 1907, nor was the registration of any premises cancelled. The number of premises on the register in the previous year, viz. 13, therefore, remained unaltered.

Under section 8 of the Butter and Margarine Act, 1907, 23 fancy or descriptive names for use in connexion with margarine were approved by the Ministry. Approval was withheld in five cases.

9. AGRICULTURAL SCHEMES.

County Schemes.

- (a) Poultry-keeping.
- (b) Butter-making.
- (c) Horticulture and Bee-keeping.
- (d) Prizes for Cottages.

- (e) Grants to Agricultural Societies.
- (f) Horse-breeding.
- (g) Cattle-breeding.
- (h) Swine-breeding.
- (i) Sheep-breeding.

Central Schemes.

- (a) Registration of Dairy Cattle.
- (b) Milk Recording Associations.
- (c) Goat-breeding.
- (d) Creameries.

County Schemes.

Only the salient features of the above are referred to in this report as the schemes are published separately and copies may be obtained free of charge on application to the Ministry. Broadly speaking the schemes may be grouped under two heads : —(i) instructional schemes which provide for practical advice and assistance to be given by experts on such matters as poultry-keeping, butter-making and horticulture, and (ii) livestock breeding schemes under which residents in each county are encouraged by means of premiums to keep approved stallions, bulls, boars, rams, and goats for the benefit of farmers in their respective districts.

The schemes are revised annually by the Ministry after the local authorities have been given an opportunity to suggest changes, and the Ministry is also assisted in this annual revision by a number of advisory committees as well as by the consultative committee, all of which are composed of practical agriculturists with special knowledge of the branch of the industry with which their particular committee is concerned.

The Ministry has adhered to the policy of devolving upon local authorities such responsibility in the administration of local schemes as is compatible with efficiency and in the majority of these schemes the county committees are responsible for the basic operations, *e.g.*, the selection of persons to keep premium sires under the live stock improvement schemes and of breeders to keep poultry stations in any county is left to the county committee concerned.

The cost of financing the ordinary county schemes is defrayed from the joint funds provided by the local agricultural rate and by moneys voted annually by Parliament to cover the operations of the Ministry of Agriculture.

(a) Scheme of Instruction in Poultry-keeping.

Mainly as a result of the Ministry's propaganda work an increasing number of farmers are now beginning to realize that when conducted on sound principles egg production can be made one of the most profitable branches of their farming operations.

That poultry-keeping is extending in Northern Ireland may be gauged from the fact that on the 1st June, 1929, the poultry population was 8,309,191, as compared with 7,979,262 on the corresponding date in the previous year. The financial possibilities of the industry are not, however, yet fully realized, especially on the smaller farms, and the above-mentioned scheme aims at disseminating knowledge and affording assistance to all breeders engaged in poultry-keeping, special attention being devoted to the poorer farmers in the backward districts.

Instruction.—As will be seen from the following table ten instructors were employed under the scheme during the past year, seven of whom also acted as instructors in butter-making, although all ten instructors are fully competent to give advice on both subjects. The instructors' duties are set out in detail in scheme No. 10, but it may be here stated generally that instructors are required to promote improvement in poultry-keeping in their respective counties, and their principal work consists in conducting lectures, classes and visiting farms to give assistance and advice.

The general operations of the scheme for the past season are summarized in the following table:—

County	No. of instructors	No. of lectures	No. of visits	No. of courses of instruction given	No. of daily classes in these courses	No. of pupils on class attendance register
Antrim ..	2*	8	1,593	4	58	80
Armagh ..	1*	7	905	1	16	14
Down ..	2*	2	1,353	3	47	60
Fermanagh .	1	5	950	1	13	19
Londonderry	2*	13	2,072	5	72	94
Tyrone. ..	2	14	1,381	5	71	93
Totals ..	10	49	8,254	19	277	360

* Employed also as instructor in butter-making.

Poultry Stations.—The poultry stations scheme is also in general operation and is linked up with the scheme of instruction, the services of the instructors in poultry-keeping being utilized in connexion with the establishment and supervision of the poultry stations. Reference was made in the Ministry's last annual report (page 63) to the provision of supplementary funds to be applied in extending the existing poultry stations scheme and as a result of this grant a considerable impetus was given to the scheme during the season under review. It will be seen from the following tables that the increase in the number of stations amounted to practically 40 per cent. as compared with 1927-28.

Full particulars in connexion with poultry stations will be found in scheme No. 11, the basis of which is the provision of a limited number of premiums for persons selected by the several county committees of agriculture to keep poultry stations. The scheme recognizes three classes of stations, viz., hen or hen and duck stations, goose stations and turkey stations, and general particulars relating to each kind of station are as follows :—

Station.	Maximum premium payable	No. of sittings to be distributed	No. of eggs in sitting	Average price per sitting
	£			s d
Hen or Hen and Duck	7	70	12	2 6
Goose	2	12	3	3 0
Turkey	3	20 hens to be served at a fee not exceeding 1/- per service.		

Provision is also made in the scheme for (1) an additional premium, not exceeding £3, for selected station-holders who undertake to trapnest their birds during the winter months, and (2) payment of small grants, subject to certain conditions, to new station-holders to assist them in procuring suitable fowl-houses and birds.

The number of stations and of sittings of eggs distributed, etc., in each county during the period under review were as follows :—

County	No. of egg distribution stations		Sittings of eggs distributed	No. of egg distribution stations (goose)	Sittings of eggs distributed	No. of turkey stations	No. of hens mated
	Hens only	Hens and ducks					
Antrim ..	43	21	8,153	17	240	62	2,108
Armagh ..	27	7	3,891	17	226	47	1,889
Down ..	44	11	6,809	16	233	83	1,916
Fermanagh .	20	21	3,680	19	237	52	2,554
Londonderry	40	13	5,523	24	322	60	2,216
Tyrone . . .	49	14	6,523	29	251	88	4,019
Totals ..	223	87	34,579	122	1,509	392	14,702
Totals for 1927/28	128	81	21,779	95	1,335	286	11,201

Table showing the numbers of sittings of eggs (by breeds) distributed from poultry stations in each county. Duck stations are shown separately but are not recognized for premium purposes except when combined with hen stations :—

*Poultry Stations by Breeds.
Hen and Duck Stations.*

Breed.	Antrim		Armagh		Down		Fermanagh		Londonderry		Tyrone		Total	
	No. of stations	No. of sittings	No. of stations	No. of sittings	No. of stations	No. of sittings	No. of stations	No. of sittings	No. of stations	No. of sittings	No. of stations	No. of sittings	No. of stations	No. of sittings
White Wyandotte	27	2,960½	13	1,368	23	2,839	13	1,080	19	1,699	21	2,027	116	11,973½
White Leghorn	15	2,656	4	650	5	560	11	869	12	1,223	5	532	52	6,490
B.P. Rock	2	130	—	—	—	—	—	—	2	123	2	145	6	398
B. Orpington	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Black Leghorn	—	—	—	—	—	—	1	101	—	—	2	133	3	234
Brown Leghorn	—	—	—	—	1	79	2	136½	—	—	—	—	3	215½
Black Minorca	1	98	2	154½	1	75	4	365½	—	—	—	—	8	693
Light Sussex	2	111½	—	131	5	443	2	158	4	530	6	568	21	1,941½
Rhode Island Red	17	1,959	13	1,430	20	2,553	6	487	16	1,762	27	2,833	99	11,024
Ancona	—	—	—	—	—	—	2	186½	—	—	—	—	2	186½
Indian Runner	6	41	1	21	3	46	13	209	6	50	11	205	42	572
Khaki Campbell	11	141	3	73	5	90	7	63½	4	57	1	34	30	463½
Aylesbury	4	53	3	63½	3	124	1	19	3	79	2	46	16	387½
Totals	..	8,153	..	3,891	..	6,809	..	3,680	..	5,523	..	6,523	..	34,579

The amounts paid in premiums to holders of stations under the scheme in 1929 were as follows :—

County	Hen or hen and duck stations	Goose stations	Turkey stations
	£ s d	£ s d	£ s d
Antrim	413 19 10	31 18 9	163 9 9
Armagh	185 9 11	32 6 8	126 15 6
Down	332 4 0	30 4 5	205 11 0
Fermanagh	222 17 0	34 6 8	137 10 0
Londonderry	267 9 9	44 3 5	162 7 9
Tyrone	353 7 10	54 11 2	241 14 6
Totals	£1,775 8 4	£227 11 1	£1,037 8 6

Poultry Demonstration Farms.—These farms are five in number and full particulars relating thereto were given in previous annual reports. The usual subsidy to each owner was continued in respect of the year under review and three of the farms were utilized as training centres for selected pupils from the Ulster Dairy School who desired to specialize in commercial poultry-keeping. There are generally about four girls trained annually—the period of training lasts one year, and it is the practice to interchange the pupils between the farms at the end of about six months in order to widen their poultry experience.

Bacillary White Diarrhoea.—Reference was made in the Ministry's sixth annual report (page 61) to the introduction of a scheme for the blood-testing of breeding stock in flocks where there was reason to suspect the existence of bacillary white diarrhoea. Owing to the gradual spread of the disease in certain areas in Northern Ireland it was deemed advisable to institute firmer measures to prevent the disease becoming widespread, and, accordingly, a more comprehensive scheme was introduced this season. Full particulars of the scheme will be found on pages 144–5 of the appendices to this report.

Egg-laying Test.—Particulars of the egg-laying test (pullets) held by the Ministry during the season under review will be found at page 51 of this report.

(b) *Scheme of Instruction in Butter-Making and Home Cheese-making.*

The making of butter and cheese on the farm for home consumption is necessarily an important factor in countries where dairy farming is extensively practised and although there are a large number of creameries in Northern Ireland a considerable quantity of butter is made in farm dairies for home use and for sale in local markets. This scheme aims at assisting home buttermakers and the principal duties of the instructors are, briefly, to conduct classes in butter-making at suitable centres,

visit home dairies to advise and assist in the process of butter-making, and give demonstrations in the making of butter and cheese.

The following is a summary of the work carried out during the year under review by instructors in the four counties in which the scheme was in operation :—

County	No. of Instructors	No. of lectures	No. of visits to private dairies	No. of courses of instruction given	No. of daily classes in each course	No. of pupils on class attendance register
Antrim	2	1	*	2	31	23
Armagh	1	—	*	1	16	12
Down	2	—	*	3	46	31
Londonderry ..	2	—	*	4	62	46
Totals	7	1		10	155	112

* Included in number of visits paid in connexion with the scheme of instruction in poultry-keeping.

Particulars of the work carried out under the Ministry's scheme for improving the quality and marketing of dairy produce in connexion with creameries will be found at page 89 of this report.

(c) *Scheme of Instruction in Horticulture and Bee-keeping.*

The chief duties of the horticultural instructors are to visit gardens and orchards and give practical demonstrations on the spraying, planting, pruning and grafting of fruit trees ; to deliver lectures on general horticultural subjects ; to visit apiaries and give instruction in the principles and practice of modern bee-keeping and to advise farmers, cottagers and others interested in any matter appertaining to horticulture or bee-keeping.

Particulars of the work performed by the instructors during the past season are given in the following table :—

County	No. of instructors employed	No. of visits and demonstrations	No. of lectures delivered	Total attendance at lectures	No. of demonstration plots	No. of vegetable plots
Antrim	2	1,886	16	571	47	40
Armagh	2	1,624	23	520	8	27
Down	2	1,302	10	137	10	69
Fermanagh ..	1	955	12	100	2	—
Londonderry ..	1	837	14	251	31	6
Tyrone	1	1,173	27	346	45	23
Totals	9	7,777	102	1,925	143	165

In view of the success which attended the public demonstrations held during the last few seasons in selected orchards to

demonstrate the efficacy of spraying for the prevention of apple scab, it was decided to hold a further series of public demonstrations this season. Accordingly each of the county committees arranged demonstrations in suitable orchards where during the past spring and summer the local instructors in horticulture had plots of trees sprayed. In addition public demonstrations on a larger scale were arranged at three specially selected centres—one in county Antrim and two in county Armagh—and at these centres officers of the Ministry were in attendance to explain the details of the spraying experiments and to advise fruit growers present.

The apple orchard competitions were carried out as usual in 1929, and the judges in this season's report commented on the steady increase in the number of orchards entered yearly since the revival of these competitions five years ago, and also on the distinct improvement in the standard of orchard culture generally. The report further stated that the majority of the twenty-six orchards entered in the competitions produced very fair crops, and that where summer sprays had been applied there was very little blemish by scab on either fruit or foliage. These competitions, which are conducted annually under the auspices of the Ulster Horticultural Society, have encouraged fruit culture considerably and have helped to introduce two new factors into apple orchard cultivation in Northern Ireland, namely, (1) power sprayers, and (2) thinning of fruit. The Ministry co-operates with the society in the work of conducting these competitions by permitting one of its inspectors to act as judge, and the usual generous support towards the expenses of the competition was again forthcoming from the county committees of agriculture, counties Antrim and Armagh contributing £20 each and counties Down, Londonderry and Tyrone £10 each.

(d) *Prizes for Cottages.*

This scheme was in operation during the past season in counties Antrim and Fermanagh only, the judge in each instance being a horticultural instructor from another county. Particulars of the operations are as follows:—

County	No. of entries			No of prizes awarded in each class			Total amount expended in prizes
	Class I Cottages	Class II Ex-service men	Class III Championship	Class I	Class II	Class III	
Antrim ..	132	27	14	36	12	5	£ s d 79 0 0
Fermanagh .	13	8	6	10	5	5	43 0 0

Competition under this scheme is confined to *bona fide* cottagers resident in rural districts and the points taken into consideration by the judge in making his awards are as follows :—(a) cleanliness and general order of premises ; (b) care, and management of live stock, particularly pigs and poultry, special attention to be given to quality and housing ; (c) care and management of bees ; (d) general lay-out of garden, arrangement of crops, freedom from weeds, and care of fences and walks ; (e) cultivation of garden ; (f) fruit trees and bushes ; (g) flowers.

(e) *Grants to Agricultural Societies.*

This scheme enables county committees of agriculture, subject to the approval of the Ministry, to make grants to agricultural, poultry, horticultural, etc., societies, ploughing matches and analogous agricultural fixtures, subject to the proviso that the societies are not conducted for profit.

Under the Finance Act (Northern Ireland), 1927, agricultural shows and exhibitions are, subject to certain conditions, exempted from entertainments duty. The scheme accordingly stipulates that the inclusion of any unapproved entertainment other than a pony gymkhana in a programme of a show for which a grant has been promised by a county committee will involve the automatic cancellation of the grant, and that a society shall not be eligible for a grant under this scheme in aid of its show if there is provided at the show any side-show which has not been approved by the Ministry or any entertainment or attraction other than a pony gymkhana which is normally subject to entertainments duty.

The following table gives particulars of the grants made in each county in respect of the year 1929 :—

County	Amount allocated by county committee		Number and value of grants estimated to be paid in respect of :—								
			Agricultural shows				Skilled labour competitions (plough- ing matches, etc)				
			Number.	£	s	d	Number.	£	s	d	
Antrim	*483	0	0	12	492	13	0	2	10	0	0
Armagh	200	0	0	2	100	0	0	4	24	0	0
Down	492	0	0	12	455	0	0	3	17	10	0
Fermanagh	90	0	0	3	80	0	0	1	10	0	0
Londonderry .. .	125	0	0	5	97	10	0	2	14	0	0
Tyrone	307	0	0	8	295	0	0	1	7	10	0
Totals	£1697	0	0	42	£1520	3	0	13	£83	0	0

* Excess expenditure over ordinary allocation met from savings on other schemes.

The Ministry's representations made to agricultural societies regarding the selection of dates for the holding of their annual shows were productive of very satisfactory results as there was no overlapping of dates during the past year. This fact was brought to the notice of the county committees of agriculture and it was suggested that these committees should endeavour to arrange that agricultural show societies receiving subsidies from them should adhere to corresponding dates in future years.

Special contributions were made by the Ministry directly to the funds of the under-mentioned societies as follows:—

	£
Ulster Farmers' Union (Educational Committee)	1,300
Ulster Agricultural Organisation Society, Ltd. ..	700
Royal Ulster Agricultural Society	460
North-West of Ireland Agricultural Society ..	120
Ulster Horticultural Society	75
Ulster Goat Society	50
Ulster Ram Breeders' Association	50
Northern Ireland Utility Poultry Society ..	40
Northern Ireland Rabbit Society	20
Imperial Fruit Show	20
Ulster Grade A T.T. Milk Producers' Association	10
World's Poultry Science Association	5

(f) *Horse Breeding Scheme.*

This scheme, which supplements the Horse Breeding Act referred to elsewhere in this report, aims at the improvement of horse breeding in Northern Ireland by means of the provision of (a) premiums for high class stallions, and (b) subsidies to secure the introduction of suitable sires into districts which are inadequately supplied with such animals. The scheme was again in operation in each county during 1929, its terms being identical with that in force in 1928.

As in previous years, the suitability of stallions for the award of premiums was determined at an exhibition held in February, 1929, in the grounds of the Royal Ulster Agricultural Society at Balmoral. The animals competing at this fixture were those which, as a result of the annual inspections held in the previous October of stallions offered for licence under the Horse Breeding Act, 1926, were regarded as up to premium standard. Two classes were provided—one for Thoroughbreds and the other for Clydesdales—and for the guidance of county committees the stallions in each county were placed in order of merit in their respective classes. From these lists of eligible stallions the several county committees chose animals for the award of premiums,

In addition to the premiums offered by county committees, prizes to the total value of £100 were offered by the Royal Ulster Agricultural Society for the seven best stallions of each breed. Seventeen Thoroughbreds and twenty-six Clydesdales competed for these prizes and for premiums.

All sires attending the exhibition were confirmed as up to premium standard and, with the exception of two Thoroughbreds and three Clydesdales, were selected by county committees for the award of premiums.

Premiums were also provisionally awarded by the county committee concerned in respect of an Irish Draught stallion in county Tyrone and a Half-bred stallion in county Fermanagh. Both these animals had been placed by the Ministry in previous years in the counties named.

The Railway Companies having termini in Belfast, in accordance with the usual arrangement, carried the stallions free of charge in one direction, the cost of the carriage in the other direction being defrayed by the Ministry.

A Register was published giving particulars of the 41 stallions located in the several counties during the year.

The amounts allocated and expended by the several county committees, together with the distribution of premiums in the various counties were as follows:—

County	Amount allocated by county committee	Amount expended by county committee	Number of premiums paid by county committees in respect of			Total.
			Thorough-breds	Clydesdales	Irish Draught and Half-bred	
	£	£				
Antrim ..	375	375	2	7	—	9
Armagh ..	210	210	2	2	—	4
Down ..	600	536	6	4½	—	10½
Fermanagh .	185	185	1	2	1	4
Londonderry	300	300	2	4	—	6
Tyrone ..	360	320	2	4	1	7
Totals ..	£2,030	£1,926	15	23½*	2	40½*

* In one instance where a Clydesdale stallion travelled for service in two counties the premium was paid jointly by the committees concerned. In another case, a partial premium only was awarded in respect of a Clydesdale stallion. This explains the half-premiums in the above table.

The values of premiums adopted by each county committee in 1929 were as follows :—

County	Thoroughbred	Clydesdale	Irish Draught and Half-bred
Antrim	£65	£35	—
Armagh	1 at £70	£40	—
Down	1 at £60	£40	—
Fermanagh ..	£60	£40	£45
Londonderry ..	£60	£45	—
Tyrone	£60	£40	£40

The maximum values of premiums as prescribed in the scheme were £70 in the case of a Thoroughbred stallion and £45 for any other breed.

The Londonderry county committee made a regulation requiring the mare owner to hand to the stallion owner prior to the service of the mare a veterinary surgeon's certificate that the animal was sound. No special regulations were made by any other county committee.

The number of mares served by premium stallions under the scheme in 1929 was as follows :—

County	Mares served by Thoroughbred Stallions	Mares served by Clydesdale Stallions	Mares served by Irish Draught and Half-bred Stallions
Antrim	166	419	—
Armagh	85	137	—
Down	432	197	—
Fermanagh ..	49	173	50
Londonderry ..	125	279	—
Tyrone	119	323	67
Totals	976	1,528	117

Subsidies were granted by the Ministry towards the purchase of six stallions for service in districts where suitable sires were required. Loans were also granted to the purchasers of these sires who were required to undertake to keep the animals for five years in the districts in which they were located. Four Thoroughbred stallions and two Clydesdales were purchased and placed under these arrangements.

The usual exhibitions, which had been held for some years, of the progeny of the pony stallions introduced in 1923–24–25 seasons into the Glens area of county Antrim were discontinued,

as it was felt that the time had come for the establishment in the district of local shows of a general character at which classes for ponies might be provided. Two such shows were held in August at Cushendall and Glenarm, and at these functions there were several classes for ponies. Subsidies to the societies holding these shows were awarded by the Antrim county committee of agriculture under the Ministry's general scheme of grants to agricultural societies.

(g) *Cattle-breeding Scheme.*

This scheme aims at effecting improvement in the breeds of cattle in Northern Ireland by means of premiums for selected bulls of a high level of excellence, and undoubtedly the premium sires located from year to year with breeders under this scheme have brought about a marked improvement in the quality of the cattle population of the country. To this satisfactory result the operation of the Live Stock Breeding Act of 1922, has contributed in no small degree.

County committees of agriculture are empowered to invite applications from farmers in their respective counties who would be agreeable, if selected, to keep premium bulls. Having made their selections from the various applicants with due regard to the special needs of the various districts in each county, the committee require these selected applicants to purchase bulls which have been provisionally passed as suitable for premium purposes at one or other of the approved shows or sales. Such bulls may be procured at either of the two recognized sales in Northern Ireland at which the Ministry's inspectors attend to mark those bulls which are up to premium standard, namely, the spring show and sale held annually at Balmoral, Belfast, under the auspices of the Royal Ulster Agricultural Society and the North-West of Ireland Agricultural Society's spring show and sale held annually at Londonderry. The spring show and sale held each year at Ballsbridge under the auspices of the Royal Dublin Society is also recognized and selected applicants if they so desire are at liberty to purchase bulls of the required standard at this show.

Subject to the approval of the Ministry, premiums may be provided for bulls of the following breeds, viz., Shorthorn, Registered Dairy Shorthorn, Registered Dairy Non-pedigree Shorthorn, Aberdeen Angus, Hereford and Galloway. Bulls of the last-mentioned breed are, however, not eligible for premiums if placed in a locality outside the eastern mountainous area of county Antrim as prescribed by the Ministry. The maximum value of a premium varies in accordance with the type of bull selected: thus, the maximum premium payable in the case of a pure-bred

Registered Dairy Shorthorn bull with both dam and sire registered is £20 ; if the dam only is registered, £17. In the case of a pure-bred Shorthorn, Aberdeen Angus or Hereford bull, the maximum premium payable is £15, and for Registered Dairy Non-pedigree Shorthorn bulls and Galloway bulls the maximum premium is £13. At the end of each season the premium bulls are inspected by the Ministry's officers at local centres and if they have proved fruitful and pass inspection the owners are awarded continuation premiums.

The regulations at present in force in each county with regard to services and fees are set out in the following table :—

County	Service fees	Services.		Valuation of holding of cow owners.
		Yearling bulls	Older bulls	
		Minimum No	Minimum No.	
Antrim ..	2/6 in all cases	30	40	Not limited
Armagh ..	2/6 to 5/-	30	40	do.
Down ..	2/6 up to £50 valuation, 5/- over £50 valuation	30	40	do.
Fermanagh .	2/6 up to £25 valuation, 4/- over £25 valuation	30	40	Not to exceed £100
Londonderry	2/- up to £30 valuation, 4/- exceeding £30 valuation and in all cases of continuation premiums	30	40	Not limited
Tyrone ..	2/6 in all cases	30	40	do.

The total amount available by county committees for premiums to bulls for 1929, and the estimated expenditure in each county is as follows :—

County.	Amount allocated.			Estimated Expenditure.	Total No. of bulls standing for ordinary premiums in county.
	From joint fund.	From agricultural development fund.	Total		
	£	£	£	£	
Antrim ..	1,350	467	1,817	1,694	109
Armagh ..	574	205	779	753	49
Down ..	1,450	592	2,042	1,908	120
Fermanagh ..	500	564	1,064	1,022	65
Londonderry .	570	391	961	926	57
Tyrone ..	1,200	460	1,660	1,493	94
Totals ..	£5,644	£2,679	£8,323	£7,796	494

The following table gives particulars of the bulls selected for and awarded ordinary premiums under the scheme in 1929 :—

County	Pure-bred registered dairy Shorthorn		Registered dairy non-pedigree Shorthorn	Short-horn	Aberdeen Angus	Galloway	Total
	Dam and sire registered	Dam only registered					
Antrim ..	13	18	6	48	9	15	109
Armagh ..	4	3	4	36	2	—	49
Down ..	20	6	2	59	33	—	120
Fermanagh ..	11	2	6	16	30	—	65
Londonderry	15	3	5	27	7	—	57
Tyrone ..	17	2	3	39	33	—	94
Totals ..	80	34	26	225	114	15	494

The following table shows by counties the distribution of ordinary premium bulls in the period under review :—

County	Number of bulls retained for service from 1928	Number of bulls provisionally awarded premiums for first time in 1929	Total number of bulls approved for premiums in 1929
Antrim	66	43	109
Armagh	23	26	49
Down	79	41	120
Fermanagh ..	46	19	65
Londonderry ..	38	19	57
Tyrone	66	28	94
Totals	318	176	494

As has been pointed out in previous annual reports the grants from the Agricultural Development Fund, which was constituted in 1927, have enabled the committees to extend the ordinary premium scheme and also to place out a considerable number of "special term" bulls. The "special term" bulls are located in the poorer districts in Northern Ireland under an arrangement by which the selected applicants eventually have the bulls for nothing.

Particulars of the "special term" bulls located in 1929 are as follows :—

County.	Registered dairy short-horn	Short-horn	Non-pedigree dairy shorthorn	Aberdeen Angus	Galloway (for Glens district in Co. Antrim)	Total
Antrim ..	5	4	2	—	9	20
Armagh ..	—	9	5	2	—	16
Down ..	—	7	1	6	—	14
Fermanagh ..	1	8	—	7	—	16
Londonderry	2	1	4	5	—	12
Tyrone ..	—	5	6	5	—	16
Totals for 1929	8	34	18	25	9	94
Totals 1928	—	23	14	48	8	93*

* Three of these bulls died during the year 1928.

There were in all 714 animals standing for service in Northern Ireland in 1929 under the Ministry's schemes, as follows :—

Premium bulls	494
"Special Term" bulls (90 from 1928 and 94 new bulls in 1929)	184
Bulls supplied on reduced terms in 1927	3
Double dairy bulls supplied to Milk Recording Associations in 1924-27	25
Subsidized bulls	8
Total	714

Although the pedigree sire is indispensable for the improvement of live stock, the Ministry does not overlook the importance of proper feeding and management, and through the Ministry's research divisions the farmer is given the benefit of the most recent investigations in such matters as animal nutrition and animal diseases to which reference is made in an earlier part of this report.

(h) *Swine-breeding.*

This scheme is analogous in principle to the cattle-breeding scheme, the fundamental feature being that provision is made for the payment of premiums to farmers who undertake to keep boars that have been selected by the Ministry as suitable sires for service under the scheme. County committees are empowered to select farmers in their respective counties to keep premium boars, care being taken to ensure that the small farmer shall have as large a share of the benefits resulting from the scheme as is practicable. Full particulars are given in scheme No. 3.

This scheme is in general operation and the following table summarizes the boar premiums awarded by the several county committees in 1929 :—

County	1st year boars		2nd year boars		Breeds		Total number of boars awarded premiums
	Value of premiums	No. of boars	Value of premiums	No. of boars	Large White Ulster	Large White York	
Antrim ..	£ 9	21	£ 8	16	32	5	37
Armagh ..	9	16	8	7	21	2	23
Down ..	10	11	8	13	17	7	24
Fermanagh ..	9	14	8	12	16	10	26
Londonderry ..	16	16	8	14	20	4	24
Tyrone ..	8	20	6	21	33	8	41
Total ..	—	92	—	83	139	36	175

It will be seen from the table that the value of the premium varies from £10 to £6 and the scheme stipulates that to earn the premium the boars are required to serve from 30 to 40 sows and the service fee varies from 2/6 to 5/-.

The expenditure on the scheme in each county was as follows :—

County	Amount allocated		Total	Estimated expenditure	Total number of boars standing during service season.
	From joint fund	From agricultural development fund			
Antrim ..	£ 250	£ 66	£ 316	£ 317*	37
Armagh ..	140	60	200	196	23
Down ..	150	66	216	214	24
Fermanagh ..	150	70	220	222*	26
Londonderry ..	150	66	216	212	24
Tyrone ..	250	66	316	286	41
Total ..	£1,090	£394	£1,484	£1,447	175

* Excess expenditure over allocations met from Agricultural Development Fund.

(i) Sheep breeding.

(a) In mountainous districts.

This scheme aims at raising the standard of mountain sheep and the means adopted is the distribution of well-bred rams on easy terms to small sheep breeders. The system adopted is as follows :—

Black-face rams are purchased either by county committees through the Ministry or directly by selected applicants at approved sales. Last season all committees charged their applicants

the same flat rate, viz., £3 per ram on all rams costing up to £10; in the case of rams costing more than this figure the selected applicant was required to defray the balance.

Each breeder is required to keep the ram in good and healthy breeding condition for two seasons and at the end of that time the animal is generally disposed of to an owner in another district—in this way the ram remains in use for three or four years. This system is the only one which can be worked successfully in a mountainous district, the mountain being common to several owners of sheep and the ram having a free range in running with common flocks.

The majority of the rams were selected at the sales held in the autumn each year in Belfast under the auspices of the Ulster Ram Breeders' Association, and in addition some animals were imported from Scotland.

Steady progress continues to be made under this scheme, particularly as sheep-breeding has, for some time past, proved to be one of the most profitable branches of the agricultural industry. The table beneath shows the operations of this scheme, which was adopted in all counties save Fermanagh, in respect of the season under review :—

County	Amount allocated		Total No. of rams placed out	Nett expenditure (cost of rams less receipts from sales).	Excess over ordinary alloca- tion borne from agricultural development fund
	From joint fund	From agricultural develop- ment fund			
	£	£		£ s d	£ s d
Antrim ..	100	352	64	411 19 10	311 19 10
Armagh ..	30	58	7	48 6 0	18 6 0
Down ..	80	282	34	213 0 9	133 0 9
Londonderry ..	60	210	36	206 18 11	146 18 11
Tyrone ..	60	279	52	214 18 6	154 18 6
Totals ..	£330	£1,181	193	£1,095 4 0	£765 4 0

The Ministry continues its policy of co-operating with the Ulster Ram Breeders' Association, and makes an annual contribution to the funds of the Association in addition to recognizing the Association's autumn sales as centres for the selection of premium rams.

Most county committees continued the practice of organizing small sheep shows at which the exhibits consisted mainly of the progeny of the premium rams placed out under this scheme. In county Antrim exhibitions of this type have been held each August at Cushendall and Carnlough, and this year successful sheep shows were held in both these districts. Local agricultural

associations have now been formed in these areas and the shows rank as general agricultural shows receiving subsidies under the Ministry's scheme of grants to agricultural societies. Small sheep shows were also organized by the county committees of Londonderry and Tyrone this season.

(b) *In lowland districts.*

With the object of improving sheep-breeding in lowland districts, the scheme providing premiums for pure-bred rams of lowland breeds, which was inaugurated in 1925 in counties Antrim and Londonderry, was continued during the present season. The following table shows the number of premium rams located in each county now participating :—

County	Allocation from joint fund	Number of premium rams.		
		Border Leicester.	Suffolk	Total
	£			
Antrim	48	6	—	6
Down	120	14	—	14
Londonderry ..	104	11	1	12
Tyrone	48	5	—	5
Totals	£320	36	1	37
Last year's totals	£272	31	1	32

County Armagh agricultural committee has decided to introduce the scheme next season.

The maximum value of a premium in each county is £8, and to earn the full premium each ram is required to serve not less than 30 and not more than 40 ewes during the season, the maximum service fee charged being 2/- per ewe. A ram may be awarded a second and also a third year premium provided that it is approved each season by the Ministry. Rams are selected for premiums at one or other of the autumn sales held under the auspices of the Ulster Ram Breeders' Association and although counties Londonderry and Tyrone make provision for premiums to Suffolk rams, it will be seen from the above table that the great majority of the rams placed out under this scheme are of the Border Leicester breed.

Central Schemes.

(a) *Registration of Dairy Cattle.*

This scheme is directly controlled by the Ministry and the procedure in connexion with the provisional selection and registration of cows is given in detail in the Ministry's scheme No. 20a. The Registers referred to in the scheme, *i.e.*, "Registers of Pure-bred Dairy Cattle" in which pure-bred cows of any dairy breed and their progeny may be entered, subject to certain conditions, and the "Advanced Registers" of the various dairy breeds in which

cows of conspicuous milking qualities are eligible for entry, are all kept by the Ministry. Inspections are carried out twice each year by the Ministry and those cows which are of good conformation and well-defined type are passed as suitable for provisional selection for registration. Cows so passed are then tested for quantity and quality of milk yield and during the milking period the Ministry's milk samplers visit the herds periodically to weigh and sample the milk, to check the owners' milk records and to take milk samples which are analysed for butter-fat content at the Ministry's Chemical Research Division. Particulars of those cows which attain the prescribed standards are subsequently entered in the appropriate register.

The minimum qualifying standards for registration—ordinary and advanced—are set out in the following table:—

Breed	Ordinary Register			Advanced Register		
	Milk (lb)	Butter-fat (lb)	Percentage of butter-fat	Milk (lb)	Butter-fat (lb)	Percentage of butter-fat
Shorthorn ..	6,000	210	3	8,000	280	3
British Friesian ..	8,000	280	3	10,000	350	3
Kerry ..	5,000	175	3	7,000	245	3
Jersey ..	5,000	225	4	7,000	315	4
Any other breed	Same as for Shorthorn.					

A cow will not be eligible for registration on the above-mentioned yields unless she has produced a calf (after a normal period of gestation) within 14 months (426 days) of the date of calving immediately preceding the milking period for which the record has been kept. If, however, a cow has produced a calf between 14 and 16 months (426–487 days) from the date of calving immediately preceding the milking period, she will be eligible for registration provided she has given not less than the following yields, which will, for the purpose of entry in the register, be subject to the deductions shown:—

Breed	Minimum yield to qualify for registration		Deductions to be made from actual yield for entry in the Register	
	Milk (lb)	Butter-fat (lb)	Milk (lb)	Butter-fat. (lb)
Shorthorn	10,000	350	2,000	Corresponding re- duction based on the original cal- culated average percentage of but- ter-fat
British Friesian	12,500	437.5	2,500	
Kerry	8,750	306.25	1,750	
Jersey	8,750	393.75	1,750	
Any other breed ..	Same as for Shorthorn.			

The number of cows inspected during the period under review was 269, made up as follows:—189 pure-bred Shorthorns, 7 non-pedigree Shorthorns, 15 British Friesians, 8 Ayrshires, 47 Kerries and 3 Jerseys.

It is of interest to note that from the date on which the Ministry commenced to function, up to the 30th September, 1929, a total of 7189 cows, including 545 pure-bred Shorthorns, 52 British Friesians, 18 Ayrshires, 51 Kerries, 38 Jerseys, 3 Red Polls and 6482 non-pedigree Shorthorns, had complied with the prescribed standards for general appearance, quality and quantity of milk yield and were duly registered. Of this total the number that attained registration standard during the year ended 30th September, 1929, was, 91 pure-bred Shorthorns, 6 British Friesians, 5 Ayrshires, 11 Kerries, 5 Jerseys, and 1040 non-pedigree Shorthorns.

The following table shows the yields of all cows (pure-bred and non-pedigree) registered by the Ministry during the period 1st October, 1928–30th September, 1929:—

Breed	Number of cows registered on a yield of:—				Total number of cows registered
	Gallons 500–600	Gallons 600–800	Gallons 800–1000	Gallons over 1000	
Pure-bred Shorthorn	—	61	25	5	91
British Friesian ..	—	—	1	5	6
Ayrshire	—	2	2	1	5
Kerry	5	5	1	—	11
Jersey	—	3	2	—	5
Non-pedigree Shorthorn	—	631	305	104	1,040
Totals	5	702	336	115	1,158

The subjoined table shows the yields of all cows (pure-bred and non-pedigree) registered by the Ministry during the period 1st January, 1922–30th September, 1929:—

Breed	Number of cows registered on a yield of:—				Total number of cows registered
	Gallons 500–600	Gallons 600–800	Gallons 800–1000	Gallons over 1000	
Pure-bred Shorthorn	—	386	132	27	545
British Friesian ..	—	6	22	24	52
Ayrshire	—	12	5	1	18
Kerry	31	17	2	1	51
Jersey	8	16	14	—	38
Red Poll	—	1	2	—	3
Non-pedigree Shorthorn	—	4,149	1,789	544	6,482
Totals	39	4,587	1,966	597	7,189

Under this scheme the owners of cows which have been registered are bound to report to the Ministry all subsequent calvings and the calves are then entered in the registers as progeny provided that the sire used was one approved by the Ministry.

The recognized male progeny of registered cows are eligible to compete for the premiums allotted under the cattle-breeding scheme referred to on a previous page.

Of the 186 bulls, the progeny of registered Shorthorn cows, which were inspected during the past year 101 were provisionally selected for premiums under the general cattle-breeding scheme. Fifty-three of these animals were pure-bred with dams and sires registered; 22 were pure-bred with dams only registered and 26 were non-pedigree animals with approved milk records on one or both sides. In addition 42 pure-bred Shorthorn bulls were inspected at owners' residences and passed as suitable for the service of provisionally selected and registered Shorthorn cows.

Over 7,650 samples were taken and analysed by the Ministry for the purpose of ascertaining butter-fat percentages in the milk yielded by cows under test with a view to registration.

In order to preserve the continuity of the pure-bred dairy cattle records and to present them for public use in permanent and accessible form the Ministry publishes the data in book form from time to time. Volume I of the Ministry's "Register of Pure-bred Dairy Cattle," which was issued for sale in 1924, gave particulars of entries in the registers from 1st January, 1922, to 31st December, 1923, and the Ministry will shortly publish a second volume containing particulars of pure-bred dairy cattle entered in the registers during the period 1st January, 1924–31st December, 1928. This volume will include certain appendices giving detailed particulars of all subsequent milk yields and calvings relating to the animals entered in Volume I which have been accepted by the Ministry since the publication of that volume. It is hoped that copies of Volume II of the register will shortly be on sale from any bookseller or direct from His Majesty's Stationery Office, 15, Donegall Square West, Belfast, price 1/- nett.

(b) Milk Recording Associations.

In dairy herds it is essential that the owner should know the performance of each cow and to obtain this information records must be kept. Regard must be had not only to the quantity but also to the quality of the milk yielded by each animal and

the system of testing for butter-fat carried out at the Ministry's Chemical Research Division affords valuable assistance to farmers in enabling them to determine which cows in their herds are worth retaining. Apart from the advantages to be obtained from the weeding out of low-yielding cows there is a further benefit accruing from milk recording, namely, that the information obtained therefrom can be applied to the problems associated with breeding and feeding.

Statistics from milk recording associations since the year 1922 indicate that the yield per cow recorded has increased from 553 to 652 gallons.

The increasing interest in milk recording in Northern Ireland proves conclusively that farmers realize that the keeping of milk records affords the most reliable method of making dairy farming profitable. In the absence of such records it is impossible to obtain the best results from herds and it is only by means of the information thus obtained that owners are able to find which are the profitable and unprofitable animals in their herds.

The general terms of the milk recording scheme in operation during the year were substantially the same as for the previous year with one exception, viz. that the special annual grant of £35 to each association for the augmentation of the supervisor's salary was increased by £3.

In addition to the grants made by the Ministry to associations, the following allocations were made by county committees of agriculture towards the cost of purchasing equipment, etc. :—

<i>County</i>					<i>£</i>
Antrim	..	..	..	..	180
Armagh	..	..	..	..	70
Down	..	..	..	..	140
Fermanagh	..	..	..	..	110
Londonderry	..	..	..	..	90
Tyrone	..	..	..	..	130

Eight new associations were established at the commencement of the year, viz., one in county Antrim, two in county Armagh, two in county Down, two in county Londonderry and one in county Tyrone. Of the 66 associations recognized in 1928, two lapsed during that year and a further two failed to qualify for recognition in 1929, consequently the number of associations actually in operation during the year under review was 70.

The following tables show the growth of milk recording since the establishment of the Ministry :—

County	Number of Milk Recording Associations.								
	1921	1922	1923	1924	1925	1926	1927	1928	1929
Antrim ..	1	4	4	11	13	14	14	17	18
Armagh ..	1	1	1	4	4	5	6	6	7
Down ..	—	—	3	2	5	10	12	13	14
Fermanagh ..	1	4	3	6	6	6	9	10	10
Londonderry	—	—	1	4	4	7	7	7	8
Tyrone ..	3	4	5	7	10	11	12	13	13
Totals ..	6	13	17	34	42	53	60	66	70

County	Number of Members.								
	1921	1922	1923	1924	1925	1926	1927	1928	1929
Antrim ..	43	156	168	394	488	447	540	634	596
Armagh ..	14	47	133	167	173	189	274	268	340
Down ..	—	—	115	68	186	425	502	531	594
Fermanagh ..	15	117	94	169	198	211	345	360	371
Londonderry	—	—	58	168	132	305	302	292	326
Tyrone ..	127	121	176	198	346	391	445	429	451
Totals ..	199	441	744	1,164	1,523	1,968	2,408	2,514	2,678

County	Number of cows under test.								
	1921	1922	1923	1924	1925	1926	1927	1928	1929
Antrim ..	245	1,052	1,074	2,458	2,733	3,100	3,168	3,520	3,403
Armagh ..	112	192	506	747	680	859	1,016	1,008	1,156
Down ..	—	—	544	440	971	1,833	2,266	2,316	2,684
Fermanagh ..	133	931	698	1,119	1,044	1,034	1,668	1,805	1,881
Londonderry	—	—	306	922	824	1,793	1,750	1,638	1,849
Tyrone ..	754	934	1,210	1,417	1,861	2,264	2,297	2,320	2,426
Totals ..	1,244	3,109	4,338	7,103	8,113	10,833	12,165	12,607	13,399

A course of instruction for supervisors was held at the Agricultural Buildings, Elmwood Avenue, Belfast, from the 4th to the 9th of March, 1929, and was attended by 11 newly appointed supervisors. All aspects of milk recording were explained and those present were afforded an opportunity of discussing with the Ministry's officers the practical and theoretical sides of the milk recording scheme.

(c) Goat-breeding.

In Northern Ireland, where the majority of the holdings are small, goats have proved a popular and useful form of live stock, and with a view to their improvement the Ministry co-operates with the Ulster Goat Society, which was formed under its auspices in 1922 by prominent goat-keepers who desired to encourage the keeping of goats and the improvement of the breed in general. In furtherance of this object the society has in operation a stud goat scheme under which selected applicants are provided at reduced prices with male goats with good milking pedigrees. A premium of £2 in each case is also granted by the society provided that certain conditions specified are observed.

The keeping of milk records is also encouraged by the society. Members' records are checked at suitable intervals by the Ministry's sampling officers, and particulars of those goats which have given a calculated yield of not less than 900 lb. of milk in a lactation period not exceeding 45 weeks are entered in the Ministry's Register of Goats and a certificate to that effect is issued by the Ministry in each case. Since the inception of the scheme 35 goats have been entered in the Register.

The Ministry also undertakes to furnish the British Goat Society with particulars of those animals which have been accepted for registration on a milk yield of 1,000 lb. or over, in order that particulars of such animals may appear in the milk recorded section of that Society's herd book.

During the period under review the Ministry made a grant of £50 towards the funds of the Ulster Goat Society.

(d) Creameries.

Thirty-seven central creameries and eighty-six separating stations were visited periodically by the Ministry's inspectors with the object of providing instruction and advice on all matters relating to the production of creamery butter and making recommendations regarding working methods, machinery and general equipment. During the year, 130 visits were paid to central creameries and 100 to separating stations.

The experiments at Omagh Creamery, inaugurated in 1924, were continued during the year with satisfactory results and it has been decided to continue the investigations for a further year.

Surprise Butter Inspections.—The practice of holding surprise butter inspections monthly at selected centres in Great Britain and Northern Ireland was continued throughout the year. In order to ensure the element of "surprise" the samples were called for by telegram and every precaution was taken to

ensure that the samples fairly represented the butter ordinarily produced at the particular creameries. The samples were retained for 8-10 days in order to test their keeping quality and were then judged in respect of flavour, texture and marketable appearance by two independent butter merchants who graded them into three classes, viz., "Premium," "Standard" and "Below Standard."

Of the thirteen inspections held during the year, four were held in Belfast and one each in Manchester, Glasgow, Newcastle-on-Tyne, Blackpool, Birmingham, Swansea, Omagh, Coleraine and Enniskillen. Two inspections were held in the month of July, viz., at Newcastle-on-Tyne and Blackpool.

During the exporting season (June-October) the inspections were held at the cross-channel centres, and on the day following each inspection the samples were exhibited for examination by prominent local wholesale provision merchants. In conjunction with the inspection at Swansea an exhibition was arranged at Cardiff.

During the year the total number of samples judged at these inspections was 376 and of this number 324 or over 86 per cent. were awarded either "Premium" or "Standard" marks.

Transport of Northern Ireland Creamery Butter.—The investigations carried out by the Ministry, in conjunction with the Empire Marketing Board, to ascertain the effect of cooling before despatch on the temperature and condition of butter on arrival in Great Britain, were continued and extended during the year. It is hoped to have a full report of the results of these tests at an early date.

Adulteration of Butter.—The series of experiments commenced in 1927 with the object of collecting reliable data as to the percentage of butyric acid present in pure butter were continued during the year, samples of butter being obtained monthly from selected farms and creameries in Northern Ireland for analysis by the Reichert-Wollny method.

Marking of Butter Packages.—Under this scheme creameries producing high quality butter are awarded a special Government stamp for branding of butter boxes. Creameries obtaining at least standard marks at surprise butter inspections six times in immediate succession qualify for the award of the stamp. Where a creamery fails to gain the requisite marks in respect of a sample of butter forwarded for inspection a special sample is called for, if the special sample thus called for fails to obtain at least standard marks the stamp is withdrawn by the Ministry. To qualify for the return of the stamp creameries must obtain at least standard

marks at surprise butter inspections three times in succession. The number of creameries in Northern Ireland at present entitled to the use of the Ministry's stamp is 29.

Training of Dairymaids.—An opportunity to obtain practical training in creamery work is afforded under this scheme to girls who show special ability at the Ulster Dairy School and who wish on the completion of their course there to obtain extended practical experience with a view to securing positions as dairymaids at creameries.

The course of training normally covers a period of twenty weeks at selected creameries during the summer months, at which time the creameries are churning every day. The Ministry contributes towards the cost of the pupil's maintenance during the period of training and also makes a grant to the manager and head dairy-maid of the creamery at which the training is given.

On the completion of the course the Ministry is prepared to award its certificate of competency in creamery butter-making to those pupils whose progress has been satisfactory.

During the period covered by this report three girls were placed at selected creameries.

Course for Creamery Students.—The problem of the provision of training for students desirous of becoming creamery managers is one which has engaged the attention of the Ministry for some considerable time. It was realized that in view of the limited number of creameries in Northern Ireland and the small number of vacancies arising for managers the cost involved in the establishment of a suitable course of training in Northern Ireland would be out of all proportion to the demand for training.

The short courses of technical instruction for existing managers and assistant managers of creameries previously held were discontinued in the year 1927-28, and as a result of negotiations with the Department of Agriculture, Dublin, and the authorities of the University College, Cork, an arrangement was arrived at in August, 1928, whereby one or two Northern Ireland students would be admitted to the creamery course 1928-29 at the University College, Cork, provided that they satisfied the Ministry as to their standard of education and practical experience of creamery work. The course consisted of one term of technical training extending from October, 1928, to March, 1929, at the University College, Cork, an apprenticeship at practical work in a selected creamery in Northern Ireland in the summer of 1929 and a second winter term of technical training from October, 1929, to March, 1930, at the University. The Ministry offered one scholarship of the value of £101 10s., for competition, but none of the candidates who presented themselves at the

examination, which was held on the 4th September, 1928, was found to be suitable.

Facilities similar to those provided in connexion with the admission to the 1928-29 course at the University College, Cork, were granted to Northern Ireland students for the 1929/30 course, and two scholarships were offered by the Ministry for competition at an examination which was held on the 6th September last. Of the 10 candidates who presented themselves two qualified for the award of scholarships and were instructed to enter the University College, Cork, early in October.

Sale of Milk Act (Northern Ireland), 1927.—This Act, which became operative on the 2nd January, 1928, controls, under licence from the Ministry of Home Affairs, the sale of Grade A (Tuberculin Tested) milk from cows which pass the tuberculin test at six-monthly intervals. Officers of the Ministry's Dairy Bacteriology Division, in addition to advising prospective producers regarding alterations to premises, suitability of equipment, etc., carry out the inspection of premises and take surprise samples for the purpose of bacteriological analysis.

At the request of the Ministry the county agricultural instructors and certain officers of the Ministry's staff were appointed by the Ministry of Home Affairs to be authorized officers for the purposes of the Act.

At present there are 20 licensed producers and 3 licensed dealers of Grade A (Tuberculin Tested) milk in Northern Ireland.

Under the auspices of the Ulster Grade A (Tuberculin Tested) Milk Producers' Association a series of lectures was given in the month of March by Lt.-Col. Maddock, C.I.E., M.D., F.R.C.S.E., D.P.H., Honorary Secretary, Certified and Grade A (T.T.) Milk Producers' Association of England, at Newry, Bangor, Omagh, Belfast and Ballymoney. Towards the expenses incurred in providing these lectures the Ministry made a grant of £10 to the Ulster Association.

10. AGRICULTURAL LAWS.

Live Stock Breeding Act (Northern Ireland), 1922.

As in previous years two tours of inspection were carried out at a large number of centres in Northern Ireland—the first in February and March, the second in August and September—and by means of Press notices, posters and circulars, farmers were reminded beforehand of the necessity of applying for licences, and were advised as to the procedure to be observed in order to have the bulls inspected. At the spring sales held by the Royal

Ulster Agricultural Society at Balmoral, Belfast, and by the North-West of Ireland Agricultural Society at Londonderry, all bulls exhibited which reached the prescribed age on 31st March, 1929, were inspected for licences. Breeders of pure-bred bulls and of non-pedigree registered dairy bulls, for which classes were provided at the sales, were thus privileged, if they so desired, to have their animals inspected for licences at these fixtures instead of at the ordinary inspection centres. Purchasers of young bulls of the required standard were given licences at the sales and where older bulls were purchased the licences were transferred to the new owners.

It was found that the arrangement, under which bulls licensed or rejected in the Irish Free State were automatically licensed or rejected when imported into Northern Ireland and *vice versa*, was being abused by some cattle dealers, who were making a practice of transferring across the border bulls which, subsequent to being licensed, had not been properly cared and which, therefore, had deteriorated and become unsuitable for breeding purposes. In these circumstances, it was decided to terminate the existing arrangements, except in so far as bulls which were passed for licence at the spring sales held at Dublin, Belfast and Londonderry are concerned. Accordingly, with the exceptions mentioned, bulls imported into Northern Ireland from the Irish Free State or *vice versa* will, in future, be either licensed or rejected on their merits.

In Table "A" below particulars are given of the results of inspections held in the Spring of 1929. Table "B" relates to similar inspections held in Autumn, 1929.

Table "A".

Spring Inspections, 1929.

County.	Number of applications for licences	Number of licences granted	Number of licences refused	Number of applications withdrawn
Antrim ..	864	598	238	28
Armagh ..	304	167	124	13
Down ..	383	266	103	14
Fermanagh ..	282	176	97	9
Londonderry ..	462	318	131	13
Tyrone ..	800	568	199	33
Totals . .	3,095	†2,093	892	*110

† Including two licences granted on appeal.

* Of the 110 cases in which applications were withdrawn, 25 were in respect of bulls slaughtered before inspection, 37 castrated, 33 under age and the remaining animals exported.

Table " B."

Autumn Inspections, 1929.

County	Applications	Licensed	Rejected	Withdrawn.
Antrim	392	290	92	10
Armagh	190	140	40	10
Down	249	181	55	13
Fermanagh ..	169	103	59	7
Londonderry ..	150	101	34	15
Tyrone	301	194	86	21
Totals	1,451	*1,009	366	†76

* Including 6 licences granted on appeal.

† Of the 76 cases in which applications were withdrawn, 51 were in respect of bulls which were under the prescribed age, 20 were slaughtered or castrated before inspection and the remaining animals were exported.

Appeals were lodged in 27 cases against the Ministry's decision to refuse to grant licences under the Act. On consideration of the referees' reports the Ministry reversed the original decision and granted licences in 8 cases, the refusal to grant licences in the remaining 19 cases being confirmed.

In 5 cases during the year it was found necessary to institute legal proceedings against persons who persisted in keeping unlicensed bulls and in each instance a conviction was obtained.

Permits were granted to owners of 298 unlicensed bulls to enable them to retain the animals for a limited period for fattening purposes. Before the expiration of the permits 222 of these bulls were slaughtered—in the remaining 76 cases the permits will not expire until 31st December, 1929.

In connexion with results obtained by the operation of the Act, the following extract from a report on the Marketing of Cattle and Beef in England and Wales issued recently by the British Ministry of Agriculture and Fisheries is interesting :—

" The quality of the Irish store cattle varies considerably, but dealers select the animals according to their suitability to local requirements, so that, in general, the best feeding areas obtain the best quality supplies. There has been a general improvement in the quality of the store cattle shipped from Ireland since the Livestock Breeding Acts of 1922 (Northern Ireland) and 1925 (Irish Free State) came into force."

The Ministry desires to testify once more to the valuable assistance rendered by the Royal Ulster Constabulary in the enforcement of the provisions of the Act.

Horse Breeding Act (Northern Ireland), 1926.

During the year the number of stallions offered for licence was 169, including one case in which the owner of a stallion which had been rejected for the year 1928 was allowed to appeal, his appeal being successful. Of these, 153 were licensed and 16 rejected. Of the 16 rejected stallions two were subsequently licensed on appeal. The total number of licensed stallions standing in 1929 was therefore, 155—an increase of 9 over the number licensed in 1928.

In the following table a comparison is shown of the results of the inspection of stallions for licences in the past three seasons :

County	Number of applications for licences			Number of licences granted			Number of licences refused		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Antrim	42	40	42	37	37	38	5	3	4
Armagh	14	17	16	11	15	15	3	2	1
Down	38	44	43	34	41	42	4	3	1
Fermanagh ..	18	17	17	13	14	15	5	3	2
Londonderry ..	27	29	33	24	26	29	3	3	4
Tyrone	14	15	18	13	13	16	1	2	2
Totals	153	162	169	132	146	155	21	16	14

For the 1929 season 12 stallions were rejected for faulty conformation, 3 for unsoundness and 1 for unfruitfulness. The present position in regard to these animals is—10 castrated, 1 exported, permits for 3 granted, and 2 licensed on appeal.

Three other cases were under consideration at last report, and in two of these the stallions were castrated, the remaining animal being licensed on appeal as stated above.

Despite repeated warnings, it was found that in a few cases owners of unlicensed stallions were still retaining the animals contrary to the provisions of the Act, and in two of these instances the Ministry felt obliged to institute proceedings. Convictions were obtained in both cases.

The total number of permits granted during the year was 12, the majority being for the purpose of enabling owners to use the stallions for draught or harness purposes.

The following table shows the number of stallions of each breed licensed in each county for the 1929 season :—

	Thoroughbred	Clydesdale	Halfbred	Shire	Suffolk Punch	Irish Draught	Hackney	Pony	Percheron	Total
Antrim ..	3	10	11	—	2	—	4	6	2	38
Armagh ..	2	5	6	—	—	—	1	1	—	15
Down ..	21	12	7	—	—	—	—	2	—	42
Fermanagh	2	2	9	—	—	—	1	1	—	15
London- derry ..	2	18	4	—	1	—	1	2	1	29
Tyrone ..	3	5	5	1	—	1	1	—	—	16
Totals .	33	52	42	1	3	1	8	12	3	155

Diseases of Animals Acts.

New Orders.

(a) *The Foot-and-Mouth Disease (Importation of Animals and Poultry) Order (Northern Ireland), 1928.*—Under the 1924 Order bearing the same title it was prescribed that animals, *i.e.*, horses, asses, mules, dogs, foxes, hares and rabbits, and poultry, *i.e.*, live domestic fowls, turkeys, geese, ducks, guinea fowls and pigeons, being moved from Great Britain to Northern Ireland should be accompanied by certificates of the local authority (county council or county borough council) to the effect that foot-and-mouth disease did not exist and had not for the previous two months existed within five miles of the premises from which the animals or poultry were being moved.

Towards the end of 1928 the Ministry decided that this requirement might safely be dispensed with and the 1924 Order was accordingly revoked.

(b) *Importation of Dogs (Ireland) Order of 1902, Amendment Order (Northern Ireland), 1928.*—The existence of a considerable number of cases of rabies amongst cats in certain countries abroad was confirmed towards the end of 1928, and it became necessary to extend the provisions of the Importation of Dogs (Ireland) Order of 1902 whereby the landing of canine animals from any country other than Great Britain, the Channel Islands, or the Isle of Man is prohibited, so as to include cats and all other animals of the feline tribe, wild or domesticated. The Amendment Order to this effect was accordingly made in December, 1928.

(c) *The Foreign Animals (Northern Ireland) Order of 1929*—In January, 1929, an outbreak of foot-and-mouth disease was

confirmed in California, and it was therefore considered desirable to bring, by the above-mentioned Order, the United States of America within the scope of the Foreign Animals (Northern Ireland) Order of 1928, which prohibits ruminating animals or swine being brought as ships' stores into Northern Ireland ports from countries where foot-and-mouth disease exists.

Information was later received that the outbreak of disease had been confined to the State of California, and by the Foreign Animals (Northern Ireland) No. 2 Order of 1929 the Ministry freed the United States of America with the exception of California from the embargo of the original 1929 Order.

No further outbreaks of foot-and-mouth disease having been located in California the Ministry was able at the end of August, 1929, to remove the embargo still remaining on the State of California, and the Foreign Animals (Northern Ireland) No. 3 Order of 1929 restored the original position.

(d) *The Slaughtered Animals (Compensation) Order (Northern Ireland) of 1929.*—As foreshadowed in the Ministry's last annual report, the Slaughtered Animals (Compensation) Act (Northern Ireland), 1928, was passed by the Parliament of Northern Ireland in the autumn session of that year and has now become law. The Act empowered the Ministry to name by Statutory Order an appointed day on which the Act should become operative, and, by the Order referred to above, the 1st May, 1929 was so named. From that date exporters are required to pay a small fee on each animal exported so as to constitute an insurance fund from which compensation can be paid for animals shipped through Northern Ireland ports and slaughtered in British landing places under the provisions of the Diseases of Animals Acts. The Act of 1928 provides that the levying of fees may be suspended when the fund reaches a figure of £5,000.

The fund is administered by a Board of six trustees appointed under the Act by cattle traders' associations in Northern Ireland.

Outbreaks of Disease.—Outbreaks of disease reported to the Ministry during the year were as follow :—

Bovine Tuberculosis		Anthrax	Parasitic Mange	Sheep Scab	Swine Fever
No. Outbreaks	No. animals declared affected	No. outbreaks	No. outbreaks	No. outbreaks	No. outbreaks
1,104	1,132	1	2	57	7

*Importation of breeding animals :**(a) from Scotland.*

During the period covered by this report the Ministry issued permits, after careful investigation, for the importation of 13 bulls, 53 heifers, 4 rams, 332 ewes, 2 boars, and 1 sow, from approved premises in Scotland for isolation at importers' premises in Northern Ireland. The cattle were composed of the following breeds :—Shorthorns, 4 bulls, 4 cows and 2 heifers ; Ayrshires, 4 bulls, 12 cows and 26 heifers ; British Friesians, 2 bulls and 9 heifers ; Galloways, 3 bulls. The sheep imported were classified as follows :—Border Leicester, 1 ram and 22 ewes ; Black Face, 2 rams and 310 ewes ; and 1 Wensleydale ram. The swine were—One White Ulster boar, one Middle White boar and one Middle White sow.

The Ministry also issued permits for the importation of 10 bulls, 29 heifers and calves, 67 rams, and 2,469 ewes from sales for isolation at importers' premises in Northern Ireland, the promoters of these sales having first undertaken to comply with certain conditions laid down by the Ministry. The cattle importations were as follows :—Shorthorns, 5 bulls, 12 cows, 6 heifers and 1 calf ; Aberdeen Angus, 5 bulls and 4 heifers ; and 6 Ayrshire cows. The sheep importations were comprised of the following breeds :—Border Leicester, 9 rams and 12 ewes ; Black Face, 58 rams, 2,347 ewes and 110 Cheviot ewes.

Permits were also issued for the importation of 59 bulls, 5 heifers and 104 rams from Scotland, via the Belfast Animals Quarantine Station. The following breeds comprised the cattle importations :—Shorthorn, 23 bulls and one heifer ; British Friesians, 9 bulls and 4 heifers ; 10 Galloway bulls, and 17 Aberdeen Angus bulls. Six of the rams were of the Border Leicester breed, while the remainder were Black Face.

Unfortunately at the commencement of the season, during which sheep breeders in Northern Ireland are accustomed to bring in large drafts of breeding ewes from Scotland, an outbreak of foot-and-mouth disease occurred near Glasgow and the Ministry was forced reluctantly to suspend all such importations during the autumn of 1929.

(b) From England.

Two consignments of breeding animals were also imported during this period from England via the Belfast Animals

Quarantine Station. Particulars of the consignments are as follow :—

First consignment--	one red Poll bull,
	six „ heifers
Second „	one Hereford bull
	one British Friesian bull
	six British Friesian heifers
	one Spanish ram
	one Middle White boar
	three British goats
	two Saanen goats.

In addition to the importations referred to above one Hereford bull and two Anglo-Nubian goats destined for Northern Ireland were, with the Ministry's permission, imported via the Quarantine Station, East India Dock, London, through the port of Waterford, along with consignments of animals for the Irish Free State.

Importations of goods packed in hay and straw.—The Ministry, during the past year, issued 458 licences authorizing the importation into Northern Ireland from Great Britain of goods packed in hay and straw. Licences to the number of 74 were also issued during this period for the importation of goods similarly packed from places abroad.

The principal commodities imported from Great Britain under authority of these licences were glass bottles and fireclay goods, while the “ foreign licences ” were in the main in respect of straw envelopes.

In all cases where the straw imported was employed as packing material it was destroyed under the supervision of the Royal Ulster Constabulary on arrival at its destination.

Exportation of Horses.—The Ministry issued certificates in connexion with the export of 135 horses to the United States of America, and 4 to Canada. In almost every case these animals were of the hunter type.

Transit of Animals.—The Ministry's veterinary inspectors visited numerous markets and fairs throughout Northern Ireland and it is pleasing to note that cases of ill-treatment of animals discovered at these markets and fairs were very few in number.

Newry Port.—The port of Newry, which was closed for a considerable period while the culvert which had subsided was being repaired, was re-opened and the shipment of animals therefrom has been resumed.

Detection of Disease at Markets and Fairs.—As an experiment

the Ministry approved of a scheme proposed by the Armagh county council, whereby that local authority's veterinary inspectors attend all markets and fairs in the county, with a view to the detection of cattle suffering from bovine tuberculosis or sheep suffering from sheep scab. The scheme will continue until the end of the calendar year, 1929, after which the local authority will meet to consider the facts disclosed in their inspectors' reports.

Markets and Fairs (Weighing of Cattle) Acts, 1887 and 1891.—During the year inspection of the accommodation provided for the weighing of cattle as required by these Acts was carried out by officers of the Ministry. The reports received indicate that the weighing facilities were satisfactory.

The Acts provide that, where reasonable cause is shown by an auctioneer, an Order may be made by the Ministry exempting him from compliance with the provisions of the Acts. Application for one such exemption was received and sanctioned.

Dishorning of Young Calves.—The Ministry has always endeavoured to impress on the farming community the advantages to be gained from the practice of dishorning calves intended for export as stores. It is a fact that Irish store cattle are worth more per head when they have been dishorned and one extensive cross-Channel purchaser has stated that he was willing to pay up to £1 per head more for cattle if dishorned as he would then be assured that they would reach their destination in good condition.

During the spring of 1929 a further campaign to secure the more general dishorning of calves was undertaken. By means of posters, 10,000 copies of which were displayed throughout Northern Ireland, attention was directed to the fact that one penny spent on dishorning a calf with caustic potash adds one pound to its value when sold as a store. A similar number of the posters in handbill form were issued to the agricultural community through every practicable channel.

Apart from such publicity efforts, demonstrations in the actual dishorning process were widely given by the agricultural instructors and overseers and the matter was suitably impressed on students at winter agricultural classes.

Dishorning was made a special feature at the Ministry's educational exhibit at the Royal Ulster Agricultural Society's Spring Show where demonstrations were given.

Destructive Insects and Pests Acts, 1877 and 1907.

Destructive Insects and Pests (Northern Ireland) Order, 1922.—In connexion with the importation of plants from abroad this Order requires that all consignments must be certified as to freedom from plant diseases or pests by the official plant inspection

service of the exporting country. During the year 374 such consignments were brought in consisting mainly of shrubs and bulbs from Holland.

With a view to preventing the introduction into Northern Ireland of certain pests of the elm tree which had appeared in Great Britain as well as on the continent of Europe, the Ministry made the Importation of Elm Trees (Prohibition) (Northern Ireland) Order, 1929, prohibiting as from the 1st February, 1929, the landing in Northern Ireland of living elm trees from any country outside Ireland.

Sale of Diseased Plants (Northern Ireland) Order, 1927.—The Ministry's inspectors visited 14 sales of nursery stock in Belfast and the county instructors in horticulture visited 21 auctions throughout the province but in no instance were any diseased bushes found exposed for sale.

In addition to the inspection of nursery stock exposed for sale at auctions regular visits are paid to all nurseries in Northern Ireland.

American Gooseberry Mildew and Black Currant Mite (Ireland) Order, 1912.—Twenty-six licences were issued under the provisions of this Order for the importation of 2,443 gooseberry and 1,072 currant bushes from cross-Channel nurseries.

Seventy-nine private gardens were visited and 32 cases of American gooseberry mildew were reported but in no instance was it found necessary to order the destruction of the diseased bushes. In this connexion it may again be mentioned that the spraying of bushes with approved fungicides has proved effective in the treatment of the disease.

Black currant mite was found in 43 cases and approximately 1,000 bushes were voluntarily destroyed. Some 3,500 bushes which had been reported as being slightly affected by the disease were treated with satisfactory results.

Regulations Affecting the Export of Plants.—In connexion with the important trade in nursery stock which Northern Ireland has developed with foreign countries, the Ministry's inspectors examined and certified 303 consignments composed mainly of roses and bulbs for Canada, United States and New Zealand.

With regard to the reference in the last report to the restrictions imposed by the Canadian authorities on packing materials for consignments of nursery stock sent to Canada, the Canadian authorities have now, as a result of the Ministry's representations, modified their restrictions, and nursery stock from Northern Ireland, if packed in boxes, will be allowed entry into Canada when

the outside of the boxes has been sprayed with disinfectant at the Canadian port of landing. By its action in this matter the Ministry has been successful in securing the removal of a serious impediment to our export trade in nursery stock.

Weeds and Agricultural Seeds Acts (Northern Ireland), 1909 and 1929.

(a) *Noxious Weeds.*—The enforcement of legislation designed to secure the destruction of noxious weeds in Northern Ireland had, up to this year, been under the direct control of the Ministry. As has been explained in previous reports the Ministry each summer placed about 14 temporary inspectors at convenient centres throughout the province, who visited as many farms as practicable. Where noxious weeds were found growing the occupier of the land was interviewed and an endeavour was made to get him to destroy the weeds voluntarily. If the interview was not satisfactory a notice was served on the occupier requiring him to destroy the weeds within a specified time. A second visit was made to ascertain if the weeds were destroyed and, if not, the matter was reported to the Ministry with a view to the institution of legal proceedings.

It was, of course, impossible for 14 inspectors to visit more than a small percentage of the farms in Northern Ireland. For instance, in 1927 only 7 per cent. of the holdings were visited, and in 1928 10 per cent. were visited. It was obvious, therefore, that under such circumstances only the fringe of the weeds problem was touched. The Ministry, accordingly, decided in consultation with the Ministry of Home Affairs that an adequate inspection with a view to the destruction of noxious weeds could best be achieved by transferring to the police the duty hitherto performed by the special inspectors, and a Bill designed mainly to give effect to this decision was prepared by the Ministry and was passed into law on the 11th July, 1929.

The new Act, which is entitled The Noxious Weeds Act (Northern Ireland), 1929, gives the Ministry power to declare ragwort, thistle, dock or ox-eye daisy as noxious weeds throughout the whole of Northern Ireland and accordingly ragwort, thistle and dock were so declared in 1929.

Prior to the coming into operation of the Act the police were fully informed as to their new duties under the Act both by means of a carefully prepared circular of instructions and by personal explanations by a member of the Ministry's staff who visited each police district in Northern Ireland.

It is satisfactory to record that the new system of police inspection operated smoothly and efficiently during the summer of

1929. A remarkable general improvement in weed destruction was noticeable and this gratifying result was achieved with recourse to legal proceedings in only ten cases. In each of the cases brought into court convictions were secured.

It may be noted that legal proceedings can be instituted only with the consent of the Ministry and that conviction for failure to destroy weeds now entails a minimum penalty of £1 for a first and £2 for a second offence.

Mention should be made here of the 7 cases referred to in last year's report in which proceedings were then pending for failure to destroy weeds. Convictions were subsequently secured in six of the cases. The remaining case, one in which the defendants were executors to an estate, was dismissed on a legal doubt as to the appointment of the executors.

(b) *Agricultural Seeds*.—Reference was made in the last report to the action to be taken against those traders from whom unsatisfactory samples had been obtained in the spring of 1928. After very careful investigation of the 16 cases in question the Ministry decided to publish in accordance with the provisions of the Act details of seven of the cases.

The usual sampling of agricultural seeds exposed for sale in Northern Ireland was carried out by the official samplers. Special attention was directed towards the sampling of seeds exposed in markets by itinerant hawkers and of packeted vegetable seeds. Altogether 250 samples were drawn and tested and in only 20 cases were unsatisfactory features revealed. The question as to the further action to be taken in regard to these unsatisfactory samples is at present receiving consideration.

Fertilizers and Feeding Stuffs Act (Northern Ireland), 1926.

On the whole, the Act which became operative only on the 1st July, 1928, is now working smoothly and efficiently. Merchants generally are complying satisfactorily with the various requirements of the Act although action by the Ministry in isolated cases is still necessary. For example it was found that when selling feeding stuffs a few merchants furnished statutory statements which did not give individual figures of oil and albuminoid content. The merchants in question were instructed that such individual figures must be given and that the giving of one figure for the combined oil and albuminoid content does not constitute compliance with the legislation. This point was stressed in a further circular to merchants explanatory of the more salient features of the Act which was issued by the Ministry towards the close of 1928.

The official sampling and analysis of the various fertilisers and

feeding stuffs on the Northern Ireland market showed that the quality of such commodities continues generally to be satisfactory.

Bee Pest Prevention (Ireland) Act, 1908.

During the year the services of the county instructors in bee-keeping were available for bee-keepers. 897 apiaries were visited and advice as to treatment of bees, etc., given.

The numbers of cases of foul brood and acarine diseases reported were somewhat larger than in 1928, being 15 and 33 respectively, as against 8 and 19 in the previous year. In the outbreaks of foul brood, 6 cases were segregated and in 9 cases the bees were voluntarily destroyed. As regards acarine disease, Frow's treatment was carried out in 20 instances, and in the remaining 13 the bees were voluntarily destroyed.

11. FLAX AND POTATO INDUSTRIES.

(a) Flax Industry.

The increase in the acreage of flax sown in Northern Ireland in 1928, to which reference was made in the last report, was not maintained in 1929 when 33,914 acres were planted. This acreage is some 3,000 acres, or approximately 9 per cent. less than the acreage in the previous year. The reduced prices obtained by farmers for their scutched flax in 1928 were largely responsible for this decrease. However, the 1929 acreage was, with the exception of that of 1928, the highest since 1925.

The propagation for Empire use of J.W.S. flaxseed in England, Canada (Ontario) and New Zealand is still continued and limited supplies of the seed were available for Northern Ireland growers in 1929. In Canada, unfortunately, the weather conditions in 1928 were extremely unfavourable, and it was with considerable difficulty that some 30 tons of seed was secured for shipment to Northern Ireland. It is estimated that about 3,000 acres were planted there in 1929, so that increased supplies of Canadian J.W.S. seed should be available next season. In Ontario flax is grown not only for seed but for fibre purposes. At the Agricultural College of the University of Manitoba experiments are being carried out on about 10 acres, to test the possibility of growing in Manitoba, this variety of flax for seed purposes only and an extensive farmer has laid down some 300 acres of J.W.S. flaxseed this year for a similar purpose.

In New Zealand only a small acreage was sown as an experiment in the 1927-28 season, with the result that a few tons of

seed were exported to Northern Ireland last spring. In the 1929–1930 season, however, about 250 acres have been planted and the seed from that crop should be available in the coming spring. Seed obtained in recent years from New Zealand has been tested against English J.W.S. seed and the results obtained from the seed from these two countries are practically identical.

In England, the propagation of J.W.S. seed is being continued in Yorkshire and Somerset, and last year some 2,200 acres of J.W.S. were planted in Yorkshire and 600 acres in Somerset.

Flax Variety Trials.—Twelve varieties of flaxseed were tested at five centres in the Coleraine district on lines similar to those of previous years. The following varieties were tested :—

Liral No. 2.	
„ 3.	
„ 4.	
„ 5.	
J.W.S. ex England.	
J.W.S. ex New Zealand.	
J.W.S. ex Ontario, Canada.	
Dutch Commercial.	
Dutch Pure Strain H.	
„ „ „ A. 9.	
„ „ „ (unnamed).	
Hybrid 2X5.	

Propagation of Pure Lines of Flax.—The undermentioned varieties were propagated this year on an area of 5 acres on a farm in Essex and a good increase in production was obtained :—

M1–14
M3–16
Pure Line 27
Hunter's Hybrid 2X6

Flax Demonstrations.—Demonstration plots of pure line seed were laid down in those districts in Northern Ireland into which pure line varieties had not previously been introduced. Farmers in such localities were thus afforded an opportunity of comparing the relative merits of the pure lines and of Dutch commercial seed.

General.—Towards the close of the year 1928 the Ministry collected from reliable sources information as to the quantity and quality of the various kinds of flaxseed available for planting in Northern Ireland in 1929. The information thus collected was published in leaflet form and issued widely amongst the farming community before the flax sowing season commenced.

Scutch Mills Act (Northern Ireland) 1923.

The usual inspections of scutch mills were carried out by the Ministry's flax inspectors. Four cases were brought to

notice in which scutch mill owners had infringed the provisions of the Act. The owners were in each case warned that drastic action would follow any future infringements.

Tow Prices.—The prices current for tow at various centres in Northern Ireland were published in the press at intervals throughout the flax scutching season.

Instructors.—Four officers were employed by the Ministry at various centres throughout the province mainly on flax instruction duties.

(b) *Potato Industry.*

In 1929 the acreage under potatoes showed a slight decrease, the first decrease to be recorded since 1926. The total area planted was 151,804 acres, being 3,704 acres or 2.4 per cent. less than in 1928.

Immune varieties comprised 69 per cent. of the total acreage planted. The immune acreage has steadily increased since 1923, when it represented only 30 per cent. of the total area planted.

Arran Victory and Kerr's Pink were the most popular varieties this year, 55,249 acres of the former and 27,044 acres of the latter having been planted, while Up-to-Dates occupied third place with an acreage of 24,282 as compared with 43,000 acres in 1923.

Black Scab in Potatoes Orders.—The general position in regard to black scab disease remained substantially unaltered during the year and no occasion arose for any revision of the Orders made with a view to counteracting the disease.

Towards the end of the year, however, black scab disease was discovered in the neighbourhood of Ballycastle, county Antrim. The usual steps to prevent the spread of the disease were taken immediately.

While, as a rule, the great bulk of persons concerned in the potato industry readily co-operate with the Ministry in the administration of the Orders, the Ministry was obliged to take legal action in 10 cases in which breaches of the Orders had occurred. Two of these cases were in respect of the planting of non-immune varieties in scheduled areas, two were cases of failure to comply with the provisions of "rogueing" notices, and the remaining six were cases of the illegal movement of potatoes from scheduled areas to clean areas. In all cases convictions were secured.

Marketing of Potatoes Act (Northern Ireland), 1928.—Reference was made last year to the taking of legislative action with a view to safeguard the potato export trade. Towards the close of the year 1928 the Marketing of Potatoes Act on the lines indicated in the Ministry's last report was placed on the Statute Book.

Following on the passing of the Act the Ministry made the

Marketing of Potatoes Rules (Northern Ireland), 1928, which provided the necessary machinery for the operation of the new legislation as from the 1st February, 1929. In devising the rules the Ministry followed its usual policy of endeavouring to secure the co-operation of the persons affected by new legislation and of making the actual operation of the legislation as gradual as possible with a view to guarding against any unnecessary disturbances of trade conditions. It followed naturally from this policy that the standard fixed at the outset for Northern Ireland potatoes was considerably lower than will ultimately be insisted upon, and in every way inspection arrangements were planned to ensure the gradual development of the intentions of the Act with the least friction or inconvenience.

Prior to the date of the operation of the legislation a very extensive propaganda campaign was undertaken to ensure that all persons affected had a full knowledge of the new requirements and of the arrangements made to facilitate compliance with those requirements. As a result of the Ministry's efforts in this connexion it is satisfactory to be able to report that, on the whole, the Act has worked with the greatest smoothness and that already there is evidence that cross-channel buyers appreciate the fact that the standard of Northern Ireland potatoes has improved as the result of compulsory inspection.

One hundred and sixty-nine merchants have received exporter's licences.

The rules made under the Act provide that the Act should not apply to potatoes exported during the months of June to October inclusive. Accordingly, during the period covered by this report the Act was operative only for the four months February to May, when 105,545 tons of potatoes were inspected.

The experience gained during these four months coupled with the intention to develop gradually the scope of the legislation induced the Ministry to make on the 25th September, 1929, amending rules to govern the administration of the Act during the next export season.

These amending rules provide in the first place that the provisions of the Act will not apply to potatoes exported during the month of October, 1929, as it appeared that this year the volume of exports during that month would not justify the setting up of the necessary inspection machinery; secondly, that all bags of potatoes consigned from Northern Ireland under licence must bear a label indicating the name of the person on whose premises the potatoes were bagged. This provision, however, does not apply in the case of potatoes bagged at and consigned from a store of a licensed merchant, it being considered that such consignments can be identified without labelling.

Lastly, the new rules make the provisions of the Act applicable to potatoes consigned to the Irish Free State from centres in Northern Ireland at which inspection facilities are available.

Export Seed Trade.—At a conference of potato merchants convened by the Ministry early in the summer of 1929, it was pointed out that there is great scope for the development of the Northern Ireland seed trade in both foreign and home markets and that the success of the potato growing industry was each year becoming more and more dependent on the success of that trade. Emphasis was laid on the following points, that importing countries were now demanding seed of guaranteed purity; that, consequently, Northern Ireland merchants must be in a position to offer such seed and that the Ministry's scheme for the inspection of growing crops furnished the necessary means by which merchants could meet this requirement provided that it was encouraged by the merchants and that growers, in addition to availing themselves of the free inspection facilities, exercised every care in digging, storing and delivering their potatoes.

A circular was subsequently prepared and widely circulated drawing attention to these important matters and stressing the various points in which farmers could co-operate with merchants in expanding the profitable export seed trade.

In connexion with our seed trade with Great Britain, the Ministry arranged for the exhibition of samples of Northern Ireland seed at the Imperial Fruit Show held in Manchester in October, 1928. The exhibitors, growers from the six county area, succeeded in obtaining five 1st prizes, five 2nd prizes and three 3rd prizes.

Inspection of Potatoes for Export—(a) *Scheduled Areas.*—The export of potatoes from scheduled areas showed a considerable decrease as compared with the figures for the previous shipping season. From the county Down area 35,860 tons only were exported, as against 57,167 tons for the 1927-28 season, and from the Londonderry area 9,037 tons were sent this season, as compared with 14,553 in the previous year. This decrease was due to the poor demand for potatoes from England, where heavy crops were obtained in 1928.

(b) *Non-Scheduled Areas.*—The quantity of potatoes inspected before export from non-scheduled areas was 91,342 tons, 41,092 tons having been inspected in the preceding year. This increase is, of course, due to the operation of the Marketing of Potatoes Act, 1929, referred to on a previous page. Apart from consignments to Great Britain, dealt with under the provisions of the Act, shipments for various overseas markets were inspected. The chief of such markets and the quantities of potatoes inspected and exported to each are as follow:—

France	..	..	..	..	19,621 tons
Portugal	..	..	..	..	11,739 tons
Canary Islands and Spain	..			..	9,074 tons
Malta	..	..	..	..	3,475 tons

Potatoes Importation (Ireland) Order, 1920.—The object of this Order is to guard against the introduction of black scab through the importation of potatoes. It is a provision of the Order that no potatoes may be imported from Great Britain save under licence from the Ministry. During the importing season 92 licences were issued for the importation of approximately 60 tons of seed potatoes, 54 tons of which were imported from Scotland and 6 tons from England. The varieties imported were mainly Epicure, British Queen, King Edward and Ben Lomond.

Immune Varieties and Inspection in Scheduled Areas.—For the 1929 planting season four additional varieties were added to the list of immune varieties of potatoes approved for planting in scheduled areas. The varieties in question were Arran Banner, Arran Crest, Herald and Incomer. Two varieties which had become obsolete were deleted from the list, which now includes 27 varieties. Certain other immune varieties may be planted in scheduled areas under licence, but, in view of the very comprehensive list of approved varieties for which planting licences are not necessary, applications for such licences were few only four having been issued during the season.

During the summer the usual inspections of growing crops were carried out and purity certificates were issued in respect of all satisfactory crops. Certain crops which were certified as being of a very high standard of purity were listed for the information of growers who might desire a change of seed for next year.

Inspection of Growing Crops of Potatoes Outside the Scheduled Areas:—The inspection of growing crops of potatoes in non-scheduled areas was again carried out during the summer of this year. Prior to the commencement of the inspections the attention of farmers was drawn to the matter by means of advertisements and news paragraphs in the newspapers throughout the province, while those growers who had certified crops in 1928 were specially invited to apply for the inspection of their 1929 crops. It is satisfactory to record that a considerable increase in the number of applications for inspection took place, the number this year being 1,958 as against 1,375 for the year previous. This increase in the number of applications for inspection is particularly gratifying as it is certain that the future of the Northern Ireland seed export trade in the face of overseas competition is dependent largely on the maintaining of a high standard, especially in regard to purity, in our shipments.

The growth of the scheme since its inception in 1922 is indicated in the following table :—

INSPECTION OF GROWING CROPS OF POTATOES.

Certificates are issued in respect of crops of at least $99\frac{1}{2}\%$ } purity.
 Reports " " " " " " } 97% " " " " " " }

Year.	Applicants for Inspection	Certificates issued.		Acreage certified.		Total Certificates and Reports	Total Acreage
		Immune	Non-Immune	Reports	Immunes	Non-Immunes	Reports
1922	80	61	-	-	120	-	61
1923	450	356	-	-	819	-	356
1924	770	624	210*	105	1,266	550*	939
1925	1,350	1,097	386	219	2,130	968	1,702
1926	1,400	1,122	652	230	2,135	1,648	2,004
1927	1,470	1,220	870	212	2,259	2,710	2,302
1928	1,375	1,319	991	196	2,982	2,791	2,506
1929	1,958	1,555	1,318	500	3,280	3,919	3,373

* First year in which growing crops of non-immunes were inspected.

Experimental Work.—Experimental work in connexion with potatoes undertaken by the Ministry during 1929 followed on lines similar to those of previous years, viz. : -

- (1) Variety trials.
- (2) Healthy stocks *v.* stocks affected with mosaic or leaf roll.
- (3) Tests of different methods of cutting seed.
- (4) Immunity trials.
- (5) Propagation of healthy stocks.

Full details of these experiments were published in leaflet form and it is unnecessary to refer further to them here except in regard to operations under the last heading.

For the past few years the Ministry has been endeavouring to propagate stocks of potatoes free from leaf roll and the various forms of mosaic diseases which are now known to cause the "running out" of potatoes. Work in this direction was commenced in 1926 when selections were made of single plants which, so far as could be determined by observation, were healthy. Separate propagations were made from each of these plants, which were isolated throughout a turnip crop, and planted at an elevation of about 600 feet above sea level on a farm at Ballymiscaw, Holywood, in the vicinity of Belfast. The selections made in 1926 were mainly from "Arran Consul," "Arran Victory" and "Champion" crops, the two latter being varieties of which the ordinary stocks in common use are now seriously deteriorated through mosaic. In 1928 the plots grown from these selected plants were so promising that it was decided to start the propagation of healthy stocks of several other varieties, including "Up-to-Date," "Majestic," "Great Scot," "Sharpe's Express," and "Di Vernon." Arrangements are being made for the further propagation of these stocks by farmers who will undertake to grow them in isolation from all other potatoes. It is hoped that in 1930 substantial quantities of the "Arran Victory" and "Arran Consul" varieties will be available for the use of farmers in scheduled areas, and that supplies of the "Champion" variety will be available for farmers in North Antrim for the Malta seed trade.

12. FORESTRY,

The Ministry continued its policy of acquiring new areas for afforestation purposes where suitable lands were procurable at reasonable prices. During the year lands in different districts comprising a total of 4,599 acres were purchased. When to these are added the 7,539 acres already under the control of the Ministry, the total area now available in Northern Ireland for State afforestation is 12,138 acres.

The following are particulars of the newly acquired lands above referred to :—

Approximate Area Acres	Situation of land.
96	Ballycastle, county Antrim.
3,933	Rostrevor, county Down.
200	Cam Mountain, county Londonderry.
336	Drumramer, county Londonderry.
13	Tullycorker, county Tyrone.
21	Durless Black, county Tyrone.
<hr/>	
Total	4,599

Negotiations are also in progress for the acquisition of further areas comprising upwards of 3,370 acres.

The total area planted during the season was 784 acres, which is more than double the area planted in the previous season. As will be seen from Table I below the total area which had been planted when the Ministry took possession was 694 acres, while the area planted by the Ministry is 3,285 acres, representing approximately 6,000,000 trees. In future the intention is to plant about 1,000 acres annually for a number of years.

In Table II below particulars are given of the number and species of trees planted at each centre during the season 1928-29. The species were nearly all coniferae, the percentage of each species planted being as follows :—

Norway and Sitka Spruce	..	..	71.1
Douglas Fir	..	..	9.4
European and Jap Larch	..	..	9.2
Scots and Corsican Pine	..	..	6.1
Others	..	..	4.2

Grants for Planting.—Under this scheme, whereby grants may be given to persons who undertake to plant trees on a commercial scale on their holdings, one application was received and a grant was provisionally approved. In one other case where a grant was approved in a previous year some clearing and planting were done and the grant was duly paid.

Supply of Trees from the Ministry's Nurseries.—During the planting season 1928-29, as in the previous season, arrangements were made for the supply to farmers at reduced prices of young forest trees from the Ministry's nurseries. Forty-three persons availed themselves of the scheme and were supplied with 61,000 trees.

General.—In accordance with Section 32 (1) (2) of the Irish Land Act, 1909, occupiers of holdings purchased under the Irish

Land Acts must obtain the permission of the Ministry before cutting down or uprooting trees which are necessary for the ornamentation or shelter of their holdings. During the year such permission was sought and granted in 8 cases.

The Ministry's forestry inspector, at the request of the owners, visited plantations on four estates and gave advice as to the value of matured timber and the general working of the plantations.

TABLE I.

PROGRESS OF PLANTING

Centre.	Total Area	Area planted when Ministry took possession	Area Planted							Total Area planted up to 30th September, 1929	
			1921-22	1922-23	1923-24	1924-25	1925-26	1926-27	1927-28		1928-29
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Baronscourt ..	3,034	*179	293	174	211	179.5	189.25	262.5	162.3	222.5	1,873.05
Ballykelly ..	254	53.5	20.5	9.5	12	7.5	7	—	7.5	3	** 120.5
Castlecaldwell ..	303	103	41	26.5	19.5	—	13	14.5	10	6.5	** 234
Knockmany and Favour Royal	938	168	23	34.5	19.5	20	22	30.5	61.8	147.5	** 526.8
Newcastle and Castlewellan	893	—	—	—	62	73	117.25	257	119.8	88	717.05
Hillsborough ..	435	—	—	—	—	—	—	—	—	60	** 60
Tardree and Carnearney	735	† 75	—	—	—	—	—	—	—	113	188
Glenarm ..	447	† 96	—	—	—	—	—	—	—	100	196
Ballycastle ..	630	—	—	—	—	—	—	—	—	44	** 44
Rostrevor ..	3,933	† 20	—	—	—	—	—	—	—	—	** 20
Cam Mountain ..	200	—	—	—	—	—	—	—	—	—	—
Drumrater ..	336	—	—	—	—	—	—	—	—	—	—
Totals ..	12,138	694.5	377.5	244.5	324	280	348.5	564.5	361.4	784.5	3,979.4

* This area was under young wood when the land was acquired. Since that time 29 acres have been cut over and replanted.

† These areas at Tardree, Glenarm and Rostrevor were under young wood when the land was acquired. At Glenarm also an area of 12 acres of mature woods was taken over and has since been cut over by the Ministry.

** In addition, the following areas are under old wood, including shelter belts and scrub-covered areas :— Ballykelly, 120 acres ; Castlecaldwell, 60 acres ; Knockmany 75 acres ; Hillsborough, 200 acres ; Rostrevor, 300 acres ; Ballycastle, 30 acres.

TABLE II.

PLANTATIONS MADE DURING THE YEAR ENDED 30TH SEPTEMBER, 1929.

Centre	Area planted (Statute acres)			Species planted including replacements (Thousands)						
	Afforested	Re-afforested	Total	Scots and Corsican Pine	European and Jap Larch	Douglas Fir	Norway and Sitka Spruce	Beech	Others	Total
Baronscourt	110	112.5	222.5	37.4	21.3	32.4	310.0	1.7	41.5	444.3
Ballykelly	-	3	3	-	-	2.7	4.4	-	-	7.1
Castlecaldwell	-	6.5	6.5	1.1	-	1.5	21.0	-	-	23.6
Knockmany & Favour Royal	106	41.5	147.5	4.0	-	23.1	224.8	2.0	2.0	255.9
Newcastle & Castlewellan ..	18	70	88	32.5	48.8	36.5	13.5	.8	4.0	136.1
Hillsborough	33	27	60	6.6	10.3	13.9	60.0	.3	.3	91.4
Tardree & Carneary ..	113	-	113	-	-	-	177.2	-	5.0	182.2
Glenarm	25	75	100	-	43.5	16.0	74.8	-	-	134.3
Ballycastle	44	-	44	-	-	-	73.1	-	-	73.1
Totals	449	335.5	784.5	81.6	123.9	126.1	958.8	4.8	52.8	1,348.0

13. STATISTICS AND INTELLIGENCE.

The functions of the Statistics and Intelligence Branch of the Ministry comprise the collection and publication of statistical and economic information regarding the position of the agricultural industry. In addition the branch acts as an Intelligence Bureau through which general information relating to agriculture can be distributed, while contact is maintained with other agricultural departments and institutions with the object of securing up-to-date information regarding developments in other countries.

The statistical information collected by the branch includes particulars regarding the acreage under different crops and the numbers of the different kinds of live stock, the estimated production of each crop and the prices of agricultural produce and live stock, agricultural feeding stuffs, fertilizers and seeds. This information is published immediately the results are available with the object of assisting farmers in planning their programmes of farm production, and of affording guidance in the marketing of their produce through the provision of timely information regarding supplies and prices. In addition occasional information is issued regarding production in other countries.

In the following paragraphs the various lines of work which are being followed are outlined in some detail, while the publications regularly issued are clearly stated so that farmers and others may know what information is available and where it can be obtained. It may be emphasized that the majority of these publications are issued free and copies may be obtained upon request.

Annual Statistics of Crops and Live Stock.—The agricultural statistics for 1929 were again collected by members of the Royal Ulster Constabulary. For the purpose of the enumeration the country was divided into 633 districts, each of which was placed in charge of a member of the Constabulary who called at each farm and collected information regarding the acreage under crops, numbers of live stock, etc., as in previous years.

The first returns were received from the Constabulary on the 2nd July, 1929, and the last on the 22nd of the same month. A preliminary statement showing the acreage under crops and the numbers of live stock was issued on the 24th July—the same date as in 1928. This publication is issued free to all applicants and the information contained in it is generally given prominence in the public press.

Immediately following the issue of the preliminary statement a detailed examination of the returns was commenced with a view to the rectification of any errors and the compilation of final

figures. The close relation of the figures published in the preliminary statement to those obtained as a result of the final scrutiny and examination is a tribute to the efficiency of the work of the enumerators.

Crop Yields.—At the three harvest periods each year the enumerators make enquiries regarding the yields of the principal crops. The enquiries are made in respect of :—

- (a) The hay crop ;
- (b) The cereal and potato crops, and
- (c) The root and flax crops.

To obtain information each enumerator visits a number of farmers in his district ; in 1928 the number was 14,000. Independent estimates of the yields of the principal crops are also obtained from the instructors in agriculture, whilst in the case of flax, returns of actual weighings are received from a number of scutch mill owners. These independent estimates are used as a check on the estimates furnished by the enumerators. The returns from the Constabulary were used as the basis upon which the production of the principal crops was estimated. Five statements showing the results of these estimates were published as follows :—hay in October, 1928; wheat, oats and barley in December, 1928 ; potatoes in December, 1928 ; turnips and mangels in January, 1929, and flax in January, 1929. As in the preceding four years a collected statement showing the acreage and production of each of the principal crops was then compiled and published in January, 1929. All these statements are available for free issue to farmers.

Agricultural Prices.—The usual reports regarding the prices of live stock at fairs and the prices of agricultural produce at markets continued to be issued. In the case of market prices a report is issued every Monday evening showing the average prices of produce sold at the principal markets in Northern Ireland during the previous week. This statement also shows the quantity of each product marketed, while comparative figures are given for the corresponding week in the preceding year. The report also contains a short summary of the outstanding features of the markets. In the case of fairs, about twenty reports on individual fairs are issued each month. Besides giving details of the number of different classes of stock offered for sale and actually disposed of, together with the prices realized, the reports give a general summary of business at the fair. All these reports are available for free issue.

Towards the end of 1928 an attempt was made to obtain complete particulars regarding the sales of live stock at auction marts in Belfast. Two of the largest live stock auctioneering firms in the city furnished information, but at a later date one of these

withdrew its support, and complete information is now being received in respect of only one firm. The information, however, is a valuable guide to the prices obtaining for the better classes of live stock exhibited in auction marts, and also gives an indication as to the extent of the live stock trade in Belfast. Particulars of the sales at the live stock mart are published each week, and copies of this statement may be obtained on request.

A similar report showing the numbers, weight and price received for pigs at the principal live stock auction marts in Belfast has also been issued each week since 1927, and is available for free distribution.

The statutory report upon the prices and weights of cattle sold at the Belfast auction marts continued to be issued in accordance with the Markets and Fairs (Weighing of Cattle Acts) 1881 and 1891.

Annual Report upon Agricultural Statistics.—This publication contains tables giving the latest statistics on practically every branch of the agriculture of the province and also provides the opportunity of reviewing the principal changes in the agriculture of the country as revealed by the statistics. The third annual report upon the agricultural statistics of Northern Ireland for 1927 was published in April, 1929. (Copies may be obtained from His Majesty's Stationery Office, 15 Donegall Square West, Belfast, price 2/- net.)

Census of Production.—The statistics which are collected annually, while supplying full particulars regarding the production of crops, take into account the numbers of live stock only. Every five years a special census of agricultural production is taken when estimates are obtained regarding the output of live stock and live stock products as well as of crops and other miscellaneous branches of farm production. The first census of agricultural production to be taken in Northern Ireland was in 1925, simultaneously with the census of industrial production, and a report upon the agricultural output of Northern Ireland, 1925, was published in December, 1928. The report is a comprehensive survey of the agricultural industry in Northern Ireland. Although dealing primarily with the year, 1925, the progress of agriculture in Northern Ireland since 1847—the first year for which agricultural statistics were collected—is surveyed. In addition to sections dealing with the production and disposal of crops and live stock and live stock products, the general agricultural organization of the area is dealt with. Copies of the report, which is most exhaustive, may be obtained from H. M. Stationery Office, 15 Donegall Square West, Belfast, price 2/6 net.

A second census of agricultural production is due to be taken in 1930-31 and during the past year a number of discussions took

place with officers of the Ministry of Agriculture and Fisheries and the Department of Agriculture for Scotland with the object of deciding the scope of the next census and ensuring that the information to be collected in the three divisions of the United Kingdom will be broadly comparable.

Monthly Report.—This report is issued at the beginning of each month and gives a general survey of agricultural conditions in Northern Ireland during the preceding month, together with notes on the work which should be performed on the farm in the next few weeks after the appearance of the report. Tables and textual matter dealing with the course of agricultural prices, the prices of feeding stuffs and their comparative feeding value, the trade in live stock and the imports and exports of farm produce through Northern Ireland ports, are regular features of the report. In addition, the report usually contains an article dealing with some feature of economic importance to farmers, such as the market position of different kinds of agricultural produce or conditions in competing countries. This publication is sent post free to all persons desiring to obtain it. In its existing form the report was first issued in May, 1926, when the mailing list was about 800. In September, 1929, the number of copies issued was 1,650. The steady increase in the demand for this publication is a tribute to its popularity with farmers.

Journal.—The second volume of the Journal was edited during the year and was published in May, 1929. The scope of this publication is extremely comprehensive, and it contains no less than ten articles giving the results of experimental and research work which has been conducted in Northern Ireland in connexion with various problems of vital importance to farmers. A number of bibliographical reviews and short notices are also included. The Journal may be obtained from H. M. Stationery Office, 15 Donegall Square West, Belfast, or through any bookseller, at a price of 2/6 (postage extra.)

World Census of Agriculture, 1930.—In connexion with the International Institute of Agriculture, Rome, it is proposed to take a world census of agriculture in 1930. The Ministry has adhered to this project, the importance of which it is difficult to over-estimate. Although in many countries, including Ireland, a census of crops and live stock is taken every year, there are many others where a census has never been taken or has not been taken for many years. No complete statistics regarding the world's food supplies have thus been available and the present project will mean that information regarding the production of food and raw materials throughout the whole world will be collected for the first time. This information will,

as far as possible, be collected on a uniform basis. Arrangements for the census were discussed at meetings of a special commission of agricultural statisticians, which was held in connexion with the IXth General Assembly of the International Institute of Agriculture in October, 1928, and on which the Ministry was represented.

International Institute of Agriculture.—This Institute has been supplied during the year with the usual statistical and other information regarding agriculture in Northern Ireland. The Ministry was represented at the IXth General Assembly of the Institute, in Rome in October, 1928, when representatives of 67 Governments attended.

Marketing Investigations.—During the past year a number of enquiries were instituted in connexion with the methods of marketing Northern Ireland agricultural produce. These enquiries are being conducted with the aid of a grant from the Empire Marketing Board. Enquiries have been made regarding the methods of marketing turkeys, the marketing of whole milk in Belfast, the marketing of fat lambs and wool, and field work in connexion with these enquiries has been completed. A survey of markets and other channels for the disposal of farm produce in Northern Ireland is being instituted. In connexion with the national survey of the retail butter markets of Great Britain, which is being conducted by the Empire Marketing Board, a similar survey was carried out in Belfast and in certain other towns in the six county area.

At the Royal Ulster Agricultural Society's Show at Balmoral in May an exhibit was staged showing wool from different breeds of sheep and the proper handling, docking and tying of fleeces was demonstrated. This exhibit aroused considerable interest and a large number of questions were asked by farmers regarding the proper methods of handling fleeces.

Economics of Small Farms.—A scheme of enquiry has been instituted in connexion with the economic position of small farms in Northern Ireland. This enquiry is financed in part by the Empire Marketing Board.

During the spring a number of farmers were approached with a view to inducing them to keep simple financial records of their farm income and expenses. At the 30th September records were being obtained from 27 farms, and it is hoped to increase this number considerably. An inventory of the live and dead stock on the farms is taken at the beginning and end of each financial year, while the farmer is supplied with a simple account book in which to keep a record of his incomings and outgoings. None of the farms included in the scheme has yet completed a full year's accounts.

In addition to obtaining these financial records, a survey of a group of small farms in the Hillsborough area was made during the months of May and June. Comparatively little success had been made in persuading farmers with holdings of less than 30 acres to keep accounts. Accordingly, it was thought that as a result of a personal visit to a number of farmers of this class, sufficient information regarding the production and sale of crops and live stock on the farm, the purchase of feeding stuffs and other requisites, and other elements of the farm business might be obtained to enable an approximate estimate of the farm income and expenses to be made. With this object in view a special questionnaire was drawn up and results suitable for tabulation have been obtained from about forty farms.

Library.—The total number of English and foreign periodicals received during the year was almost 4,000. These consist chiefly of agricultural journals received weekly and circulated amongst members of the Ministry's administrative and technical staffs. The number of books and pamphlets received, which form permanent additions to the library, totalled 2,340, bringing the total number of publications approximately to 18,600. Many of these periodical and permanent publications are filed in the research stations situated at Stormont and at the Agricultural Buildings, Elmwood Avenue, but the greater number require to be kept at headquarters.

The number of publications issued in response to special enquiries was 1,130, a decrease on the number (1,230) issued last year. Much research work was, however, entailed in tracing reports and articles dealing with specific matters, and this part of the library work is very considerable.

The number of translations made in 1928–29—though greater than in 1926–27—showed a decrease as compared with 1927–1928, only 25 having been made in the year under review, as compared with 39 in the previous year. It is not practicable to compare the actual amount of work involved in making translations, but the following subjects which were dealt with during the past year show the diversity of this work:—(1) law *re* importation of vegetables and plant products into Dominican Republic (Spanish); 2, letter *re* exchange of publications (Beekbergen Poultry Institute), (Dutch); (3), Dutch Elm Disease and its cause. (German); (4) model rules of societies for the mutual insurance of live stock in Switzerland (French).

General.—Reports showing the number of pigs purchased each week by Northern Ireland bacon curers and the number of live pigs exported from Northern Ireland ports, together with corresponding information for the Irish Free State continued to be issued each week during the year. Throughout the potato

exporting season weekly reports were issued showing the prices paid for different varieties of potatoes. Both these statements are available for free distribution to persons interested.

At the Royal Ulster Agricultural Show held in May an exhibit of charts and graphs designed to indicate the more economic working of farms was shown. In particular, charts were displayed showing the value of maize imported annually into Northern Ireland, and farmers were advised to replace this foreign grown produce by home grown feeding stuffs. As in previous years copies of the Ministry's reports were displayed, and a number sold.

Leaflets.—During the year under review considerable additions were made to the leaflets issued by the Ministry for the information of the farming community. Leaflets dealing with the following subjects became available for issue :—

No. 56. Identification of Egg Supplies.

„ 57. Importance of Quality in Egg Production.

„ 58. Fertilizers and Feeding Stuff.

„ 59. Bacillary White Diarrhoea.

„ 60. Winter Agricultural Class

Circ. No. 8. Basic Slag.

„ 9. Smut in Oats.

Miscellaneous Publications :—

Vegetable Growing.

Potato Chute for the Farm.

Additions were also made to the series of pamphlets “ Talks to Producers ” commenced in 1928. These pamphlets have been written with a view to bringing home to the producer the requirements of the consumers. The subjects dealt with are as follows :

No. 15. Produce First Quality Eggs.

„ 16. Table Ducklings are Money Makers.

„ 17. Continued Efforts Pay in Pork Production.

„ 18. Produce the Quality of Pork the Consumer Wants.

„ 19. Hornless Store Cattle bring the Best Prices.

„ 20. Grow more Oats and Feed More Stock.

„ 21. Pure-bred Sires Produce Superior Progeny.

„ 22. More Money from Apples.

„ 23. The Farm Poultry Flock as a Money Maker.

„ 24. Good Cockerels are Cheap.

„ 25. Reduce Calf Rearing Costs.

„ 26. Important News for Chicken Rearers.

„ 27. How to get Large Sized Turkeys.

„ 28. Profitable Apple Production.

„ 29. Marketing of Honey.

„ 30. Good Sized Pullets lay Good Sized Eggs.

Requests for leaflets were received from almost 1,500 persons

during the year ; the total number of leaflets distributed being over 165,000, whilst over 15,000 " Talks to Producers " were also issued. At the Royal Ulster Agricultural Show in May almost 36,000 leaflets and " Talks to Producers " were issued to persons interested.

In the course of the year a large number of press notices dealing with various subjects of interest to farmers and persons interested in farm commodities were issued.

Publications.—The following statement shows the number of unpriced publications (excluding leaflets) issued from the branch during the year.

Publication	No. of separate issues	Circulation	Total annual issues
<i>Weekly or Daily :</i>			
Prices of Live Stock at Fairs	240	133	31,920
" Fruit at Belfast and at certain cross-channel centres	104	14	1,456
Prices of Agricultural Produce at markets in Northern Ireland	52	142	7,384
Number of Pigs cured in bacon factories	52	142	7,384
Prices of Pigs at Belfast Auction Sales	52	194	10,088
Prices of Fat Cattle at Belfast Auction Sales	52	135	7,020
Numbers and prices of Live Stock at Belfast Auction Sales	52	133	6,916
Prices of Potatoes for export during season	34	142	4,828
Number of animals exported from Northern Ireland ports	52	37	1,924
<i>Monthly -</i>			
Number of animals exported from Northern Ireland ports	12	37	444
Quantity and Value of Pig Products im- ported into the United Kingdom	12	139	1,668
Monthly Report	12	1,550	18,600
Quantity of butter manufactured in Creameries	12	30	360
<i>Annual :</i>			
Preliminary statement of the acreage under Crops and numbers of Live Stock	1	1,870	1,870
Acreage under the different varieties of potatoes	1	700	700
Production, yield and acreage of :—			
(a) Hay crop	1	543	543
(b) Wheat, oat and barley crops	1	538	538
(c) Potato crop	1	573	573
(d) Flax crop	1	543	543
(e) Turnip and Mangel crops	1	538	538
(f) Collected statement for above crops	1	700	700
Total	746	8,833	105,997

* This statement is circulated only to those creameries which furnish particulars of their trading to the Ministry. The number of persons on the circulation list, therefore, varies from month to month, but, the number (30) shown may be taken as the average circulation each month.

14. SURVEYS.

(a) Ordnance Survey.

Revisions.—As has been explained in previous reports the revision period for 25-inch scale maps is every 25 years for urban and normal country areas, and every 50 years for mountain areas. Since the completion of the last survey on that scale the counties of Down, Antrim and Londonderry have been revised on the ground and the whole of the first-named county has been republished. Approximately one-third of county Antrim has also been re-issued. Only a small number of sheets on the 6-inch scale have, however, been published, but the photographic apparatus, referred to in last year's report to enable a general revision of 6-inch scale maps to be undertaken, has now been completely installed.

In consequence of the abnormal changes in urban areas during recent years it is intended to make special revisions of such areas. Although it will not always be possible to publish immediately the result of the revisions, details on tracings will be available to the public upon application. Bangor was revised in this way in 1926 and the relevant maps have since been published.

Field Work.—The revision of county Londonderry was completed in March. During the revision period 10,000 acres were covered. Re-levelling was completed in August, 162 miles having been re-levelled.

Drawing, etc.—The preparation of 25-inch scale maps of county Antrim and county Londonderry was carried on and 80 maps of the former county were completed and republished.

Thirty-four 12-inch scale plans of county Down were corrected for reduction to 6-inch scale.

Printing, etc.—Some 8,400 maps were printed and 9,300 valued at £1,328 were issued.

Two special maps of new electoral divisions were published in May.

During the period under review the receipts were £1,255,

Stock.—The stock of maps on hand on 31st March, 1929, was 123,406, exclusive of those in hands of agents.

(b) Geological Survey.

The demand for geological survey maps continues to be very small. A stock of uncoloured maps covering the province is held and copies can, if desired, be coloured and supplied within a week from requisition.

I have the honour to be

Your Grace's faithful Servant,

E. M. ARCHDALE,
Minister.

JAMES S. GORDON,
Secretary.

Ministry of Agriculture,
Wellington Place,
Belfast.

18th December, 1929.

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OFFICIALS OF COUNTY COMMITTEES OF AGRICULTURE.

ANTRIM :—

<i>Chairman :</i>	Lieut.-Col. J. Patrick, D.L., Dunminning, Glarryford.
<i>Vice-Chairman :</i>	Charles B. Smith, Cragoran, Larne Harbour.
<i>Secretary :</i>	A. B. Clarke, B.A., County Courthouse, Belfast.
<i>Instructors :</i>	P. T. O'Hare A.R.C.Sc.I. (Agriculture). R. D. Mackay, N.D.A., N.D.D. (Hons.) (Agriculture). R. H. Clarke (Horticulture and Bee-Keeping). W. R. Saunderson (Horticulture and Bee-Keeping). Miss A. M. Nedwill (Poultry-keeping and Butter-making). Miss A. Mahony (Poultry-keeping and Butter-making). P. M'Hugh (Agricultural Overseer). J. M'Dowell (Agricultural Overseer).

ARMAGH :—

<i>Chairman :</i>	J. J. W. Dunlop, Rosemount, Annaghmore.
<i>Vice-Chairman :</i>	R. R. Murphy, J.P., Lislea, Keady.
<i>Agricultural Organizer :</i>	J. Morrison, B.Sc., N.D.A., 4 College Street, Armagh.
<i>Instructors :</i>	J. Bradshaw, B.Sc. (Agr.), N.D.A. (Agriculture). J. Hagan (Horticulture and Bee-keeping). J. Scrimgeour (Horticulture and Bee-keeping). Miss A. G. English (Poultry-keeping and Butter-making). J. Graham (Agricultural Overseer). M. Turley (Agricultural Overseer).

DOWN :—

<i>Chairman :</i>	James Ireland, J.P., Ivyholme, Lessans, Saintfield.
<i>Vice-Chairman :</i>	George Wallace, J.P., Lakeview, Corbet, Banbridge.
<i>Agricultural Organizer :</i>	J. L. M'Whinney, A.R.C.Sc.I., N.D.A., Northern Bank Chambers, May Street, Belfast.
<i>Instructors :</i>	R. W. Dickson, A.R.C.Sc.I. (Agriculture). R. F. Small, B.Agr. (Agriculture). A. E. Johnston, A.R.C.Sc.I. (Horticulture and Bee-keeping). D. W. Baillie (Horticulture and Bee-keeping). Miss W. M'Mullen (Poultry-keeping and Butter-making). Miss L. Walters (Poultry-keeping and Butter-making). J. G. Jamieson (Agricultural Overseer). V. Boyce (Agricultural Overseer).

FERMANAGH :—

<i>Chairman :</i>	Rev. Canon John Hall, Garvary, Enniskillen.
<i>Vice-Chairman :</i>	Senator J. Porter-Porter, D.L., Belle Isle, Lisbellaw.
<i>Secretary :</i>	W. H. West, Courthouse, Enniskillen.
<i>Instructors :</i>	D. T. Ritchie (Agriculture). †J. C. Johnston (Horticulture and Bee-keeping). Miss A. M. Callery (Poultry-keeping). T. C. Skelly (Agricultural Overseer). †B. M'Clean (Agricultural Overseer). H. S. Flack (Agricultural Overseer). *W. R. M. Boyd (Agricultural Overseer).

† Assumed Duty 10th December, 1928.

* " " 1st August, 1929.

† Resigned as from 4th July, 1929.

LONDONDERRY :—

<i>Chairman :</i>	Robert Guthrie, J.P., Sheep Hill, Ballykelly.
<i>Vice-Chairman :</i>	H. E. Thompson, M.B.E., J.P., Ballindrum House, Coagh, Moneymore.
<i>Secretary :</i>	T. K. Caldwell, Courthouse, Coleraine
<i>Instructors :</i>	D. R. Aiken (Agriculture). A. M'L. May (Horticulture and Bee-keeping). Miss L. Gray (Poultry-keeping and Butter-making). Miss E. E. Clarke (Poultry-keeping and Butter-making). A. J. M'Farland (Agricultural Overseer). E. Graham (Agricultural Overseer). D. M'Mullan (Agricultural Overseer).

TYRONE :—

<i>Chairman :</i>	John Johnston, Mountjoy East, Omagh.
<i>Vice-Chairman :</i>	Thomas Hegan, J.P., Desertcreat, Tullyhogue.
<i>Secretary :</i>	W. Walsh, Courthouse, Omagh.
<i>Instructors :</i>	E. S. Daly, A.R.C.Sc.I. (Agriculture). W. J. Patterson, A.R.C.Sc.I., N.D.A. (Agriculture). J. Algie, B.Sc. (Agriculture). D. M'Kenzie (Horticulture and Bee-keeping). Miss M. H. Davidson (Poultry-keeping). Miss M. A. C. Woods (Poultry-keeping). P. Dolan (Agricultural Overseer). J. M. Flanagan (Agricultural Overseer). J. M'Ferran (Agricultural Overseer). W. J. Martin (Agricultural Overseer).

GREENMOUNT
AGRICULTURAL AND HORTICULTURAL COLLEGE,
MUCKAMORE, COUNTY ANTRIM.

(Under the Management of the Antrim County Committee of Agriculture).

PRINCIPAL: R. J. FANNIN, A.R.C.Sc.(I.), N.D.A.

FERTILISERS AND FEEDING STUFFS ACT, 1928.

LIST OF OFFICIAL SAMPLERS, INSPECTORS AND AGRICULTURAL ANALYSTS APPOINTED UNDER THE ABOVE-MENTIONED ACT.

County or Borough.	Inspector and Official Sampler.	Agricultural Analyst.
Antrim ..	P. T. O'Hare, A.R.C.Sc.I., Finvoy, Ballymoney R. D. MacKay, N.D.A., N.D.D.	J. Harold Totton, F.I.C., B.A., B.Sc., 16, Donegall Sq. South, Belfast.
Armagh ..	J. Morrison, B.Sc., Agricultural Organiser, 4, College St., Armagh. J. Bradshaw, B.Sc. (Agr.) Cathedral Road, Armagh.	J. Harold Totton, F.I.C., B.A., B.Sc., 16, Donegall, Sq. South, Belfast.
Down ..	J. L. M'Whinney, A.R.C.Sc.I., Agricultural Organizer, 12, Clarendon Avenue, Bloomfield, Belfast. R. W. Dickson, A.R.C.Sc., I., "Yonville," King's Road, Knock, Belfast. R. F. Small, B.Agr., c/o Mrs. Harper, Annsboro'.	J. Hawthorne, Ph.D., F.I.C., 16, Donegall Sq. South, Belfast.
Fermanagh ..	D. T. Ritchie, Chanter Hill, Enniskillen.	Chas. M'Mullan, F.I.C., 7, William Street South, Belfast.
Londonderry ..	D. R. Aiken, 1, Union Street, Coleraine.	J. Harold Totton, F.I.C., B.A., B.Sc., 16, Donegall Sq. South, Belfast.
Tyrone ..	E. S. Daly, A.R.C.Sc.I., Coneywarren, Omagh. W. J. Patterson, A.R.C.Sc.I., Patrick St., Strabane. J. Algie, B.Sc. (Agr.), Dree House, Moy.	R. F. Blake, F.I.C., F.C.S., Scottish Provident Buildings Belfast.
County Borough of Belfast ..	—	J. Harold Totton, F.I.C., B.A., B.Sc., 16, Donegall Sq. South, Belfast.
County Borough of Londonderry	—	J. Hawthorne, Ph.D., F.I.C., 16, Donegall Sq. South, Belfast.

SALE OF FOOD AND DRUGS ACTS, 1875 to 1907—LIST OF ANALYSTS.

The post of analyst under these Acts for the several Counties and County Boroughs in Northern Ireland is held by the Analyst named in the preceding list.

ACCOUNT OF PARLIAMENTARY GRANTS IN THE YEAR ENDED 31st MARCH, 1929.

Vote Class VI. No. 2, Ministry of Agriculture.

(Moneys voted by Parliament to defray the expenses of the Ministry of Agriculture in respect of Agricultural Education and Research, Improvement of Live Stock, Agricultural Development, Agricultural Statistics, Afforestation and Diseases of Animals, including sundry Grants-in-Aid and certain Capital Expenditure under 14 and 15 Geo. V., Chap. 13, S.I. (N.I.), and 15 and 16 Geo. V., Chap. 17, S. 13 (I) (N.I.), (16 Geo. V., Chap. 4 (N.I.)).

RECEIPTS.				PAYMENTS.			
	£	s	d		£	s	d
Parliamentary Grant ..	142,478	0	0	Agricultural Research and Faculty of Agriculture ..	18,926	19	7
Appropriations in Aid ..	13,332	8	7	Building Grant to Queen's University ..	3,635	12	0
				Hillsborough Research Station and Experimental Farm ..	30,701	3	3
				Agricultural Education (net) ..	9,895	11	7
				Improvement of Live Stock ..	10,257	17	9
				Live Stock Breeding Acts ..	272	9	4
				Animal Quarantine Station ..	192	17	2
				Diseases of Animals			
				Grant-in-Aid ..	5,508	5	4
				Replacement of Live Stock ..	2,254	4	10
				Poultry Industry ..	311	13	7
				Marketing of Eggs ..	1,357	3	5
				Dairying Industry ..	169	14	5
				Grants to County Committees ..	29,044	18	9
				Grants to Agricultural Societies, &c. ..	3,171	13	11
				Flax and Potato Industry ..	9,021	16	3
				Seed Supply Schemes ..	163	5	0
				Weeds Act ..	603	8	6
				Forestry ..	8,667	13	7
				Unemployment Relief Work (Forestry) ..	3,051	12	5
				Purchase of new areas for Afforestation ..	8,175	10	6
				Collection of Agricultural Statistics ..	2,243	13	2
				Empire Marketing Schemes ..	626	6	6
				Miscellaneous ..	144	7	11
				Balance on 31st March, 1929 (to be surrendered)	7,412	9	10
Total	£155,810	8	7	Total	£155,810	8	7

SUMMARY OF LOAN ACCOUNTS ON 31st MARCH, 1929.

Nature of Loan.	Loans Outstanding on 31st March, 1928.		Loans Issued in 1928-29.		Principal Repaid in 1928-29.	Interest Received in 1928-29.	Loans Outstanding on 31st March, 1929.	
	No.	Amount.	No.	Amount.			No.	Amount.
For the purchase of Stallions	23	£ 937 8 6	6	£ 453 6 8	382 10 7	£ 44 5 6	21	£ 1,008 4 7
For the purchase of Bulls	—	—	35	1,260 9 2	31 7 0	1 10 6	34	1,229 2 2
For the purchase of Agricultural Machinery	6	507 5 0	1	52 10 0	243 1 3	27 12 8	5	316 13 9
For the erection of Fencing.. ..	2	110 0 0	7	474 0 0	10 15 6	10 9 4	9	573 4 6
TOTAL	31	1,554 13 6	49	2,240 5 10	667 14 4	83 18 0	69	3,127 5 0

Table showing by Counties the Amounts contributed from Local Rates, and the Amounts contributed by the Government for the purpose of Agricultural Schemes under Local Statutory Committees, during the year ended 31st March, 1929.

COUNTY.	Rate in the £.	Total Produce of and Contributions from Local Rates.	CONTRIBUTIONS FROM THE MINISTERS.			Additional Contributions by the Ministry of Finance from the Agricultural Development Fund.	Total Contributions from Government Funds.
			General Grant.	Grant for Special Schemes.	Agricultural Classes Grant.		
	d.	£ s. d.	£	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Antrim ..	1	2,552 7 1	5615(a)	1,001 17 7	139 5 6	1711 16 0	8467 19 1
Armagh ..	1	1,462 0 0	2,832	655 9 2	41 15 4	1217 8 0	4746 12 6
Down ..	1	2,839 9 5	4,846	700 12 6	119 12 2	1556 16 0	7223 0 8
Fermanagh ..	1	950 0 0	2,663	957 14 4	47 11 0	1291 4 0	4959 9 4
Londonderry ..	1	1,219 8 8	3,048	955 1 5	113 9 4	1395 4 0	5511 14 9
Tyrone ..	1	1,743 9 0	4,343	1,819 7 9	146 2 8	1983 8 0	8291 18 5
TOTAL ..		10,766 14 2	23,347	6,090 2 9	607 16 0	9155 16 0 (b)	39,200 14 9

(a) This includes a Grant-in-Aid of £1,000 in respect of Greenmount Agricultural College.

£ s. d.

(b) (1) For Poultry Schemes 2156 16 0

(2) For Live Stock Schemes 6999 0 0

TABLE SHOWING EXPENDITURE ON AGRICULTURAL AND LIVE STOCK SCHEMES BY COUNTY COMMITTEES OF AGRICULTURE DURING THE YEAR ENDED 31st MARCH, 1929.

County.	Itinerant Instruction in Agriculture			Winter Agricultural Classes.			Horticulture and Bee-Keeping.			Poultry-Keeping and Butter-Making.			Live Stock.			Subsidies to Shows.			Grants to Milk Recording Associations.			Miscellaneous Allocations.			General Administration.			Scholarships.			Totals.			
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.				
Antrim	703	7	0	80	4	4	968	10	3	1,427	0	6	3,591	10	9	461	8	6	180			(a)	414	13	6	782	7	9	1,211	2	5	9,820	5	0
Armagh	740	1	5	27	2	7	1,008	4	7	884	15	8	1,871	15	8	207	10	4	50			(c)	—	—	—	623	18	3	354	10	0	5,767	18	6
Down	1,085	5	8	66	1	10	907	16	3	1,619	8	7	3,718	6	7	534	15	3	120			(d)	91	19	4	1,003	12	2	973	18	9	10,121	4	5
Fermanagh	778	12	9	36	9	3	388	3	9	865	3	5	1,219	6	7	85	4	2	80				38	5	11	508	13	10	168	7	6	4,168	7	2
L'donderry	677	0	7	48	5	5	473	17	0	1,082	5	8	1,296	11	4	154	14	6	40				—	—	—	774	0	3	235	2	6	4,781	17	3
Tyrone	1,373	15	5	128	16	8	405	17	1	1,405	6	7	3,122	13	1	287	12	5	130				—	—	—	893	4	2	622	3	9	8,369	9	2
TOTAL	5,358	2	10	387	0	1	4,152	8	11	7,284	0	5	14,820	4	0	1,731	5	2	600				544	18	9	4,585	16	5	3,565	4	11	43,029	1	6

(a) (1) For Cottage and Farm Prizes

(2) For Agricultural Overseer

(c) For Cottage and Farm Prizes.

(b) Includes £688 8s. 8d. upkeep of Greenmount Agricultural College.

(d) For Cottage and Farm Prizes.

**TABLE SHOWING EXPENDITURE ON SPECIAL DEVELOPMENT
SCHEMES BY COUNTY COMMITTEES OF AGRICULTURE
DURING THE YEAR ENDED 31st MARCH, 1929.**

County.	Itinerant Instruction in Agriculture.	Agricultural Overseers.	Improvement of Pastures.	Totals.
	£ s d	£ s d	£ s d	£ s d
Antrim ..	498 15 10	296 11 10	86 18 10	882 6 6
Armagh ..	—	527 1 2	124 2 1	651 3 3
Down ..	—	695 14 10	—	695 14 10
Fermanagh ..	—	907 1 10	—	907 1 10
Londonderry .	—	836 13 7	107 8 3	944 1 10
Tyrone ..	428 2 1	1,133 15 2	214 5 0	1,776 2 3
TOTAL ..	926 17 11	4,396 18 5	532 14 2	5,856 10 6

**Expenditure of Local Authorities (County Councils) under the Diseases of Animals Acts and the Orders made thereunder
and the Amounts recouped to Local Authorities as from the General Cattle Diseases (Northern Ireland)
Fund During the year ended 31st March, 1929.**

Districts of Local Authorities.	Expenditure of Local Authorities.			Receipts from the dipping of Sheep.	Total Net Expenditure.	Amounts repaid to Local Authorities during the year ended 31/3/29 from the General Cattle Diseases (Northern Ireland) Fund.
	Salaries and Allowances of Officers.	Other Expenses.				
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
County Antrim	1,191 6 11	1,562 10 0	—	2,753 16 11	2,252 6 11	
County Armagh	784 5 6	1,040 14 0	—	1,824 19 6	1,113 9 1	
County Down	1,333 2 0	1,847 18 3	—	3,181 0 3	2,574 13 3	
County Fermanagh	351 19 2	243 19 6	90 19 0	504 19 8	413 5 3	
County Londonderry	737 12 8	774 10 11	118 9 4	1,393 14 3	867 2 10	
County Tyrone	1,698 4 10	1,820 9 8	404 5 0	3,114 9 6	2,329 18 6	
County Borough of Belfast ..	350 0 0	122 7 0	—	472 7 0	271 15 10	
County Borough of Londonderry	115 0 0	4 10 0	—	119 10 0	59 15 0	

SPECIAL ACCOUNT.

RECEIPTS.			PAYMENTS.		
	£	s d		£	s d
Balance on 1st April, 1928	..	..	Salaries of Staff ..	..	..
Parliamentary Grant (Class VI. No. 2, Sub-head C. 4)	..	..	Fees ..	..	..
Salvage of animals slaughtered in connection with :—	654	17 1	Travelling Expenses ..	..	..
(1) Pleuro-pneumonia ..	..	..		129	3 6
(2) Swine Fever ..	..	..	Miscellaneous expenses, including cost of requisites for cleansing and disinfection and casual labour in killing, burying, branding and removal of animals, and other petty expenses :—	£	s d
(3) Foot-and-Mouth Disease ..	..	..	(1) Pleuro-pneumonia ..	..	..
Transferred from General Account ..	..	..	(2) Swine Fever ..	..	..
Other Receipts, viz. ..	..	..	(3) Foot-and-Mouth Disease ..	..	..
			Compensation to owners of animals slaughtered in connection with :—	39	2 3
			(1) Pleuro-pneumonia ..	£	s d
			(2) Swine Fever ..	394	17 6
			(3) Foot-and-Mouth Disease ..	..	..
			Transferred to General Account ..	..	..
			Balance on 31st March, 1929 ..	..	..
	£654	17 1		394	17 6
			
			
				£654	17 1

SCHEME OF AGRICULTURAL AND LIVE STOCK EXPERIMENTS, 1928-1929.

Alterations and modifications of the previous year's Scheme.

Agricultural Experiments.

- Experiment No. 1 (a) Oat Variety Test. White oats suitable for the better classes of soils. The varieties Black Potato X Victory and Supreme X Victory were included.
- Experiment No. 2. Oat manurial test. In plot 2 the quantity of nitro-chalk per acre was halved and the rate of application of the mixture reduced from 7 cwt. to 6 cwt. per acre. An additional plot having nitrate of soda as the source of nitrogen was included.
- Experiment No. 4. Wheat manurial test. This experiment was amended to enable a comparison to be made between Sulphate of Ammonia and Nitrate of Soda.
- Experiment No. 5. Turnip variety test. The variety "Mancunian" (Dickson and Robinson) was included. Where possible, second weighings should be made in February, in order to obtain information regarding the keeping qualities of the different varieties.
- Experiment No. 7. Potato variety test. The size of the riddle used for grading "ware" potatoes was altered from 2" to 1 $\frac{7}{8}$ ".
- Experiment No. 8. Potato manurial experiment. This experiment conducted last year as a special test was incorporated in the scheme.
- Experiment No. 10. Liming rotation experiment No. 1. Particulars of this experiment only apply to those already laid down. Further liming rotation experiments should follow the lines of Experiment No. 11. Liming rotation No. 2.
- Experiment No. 12. Manuring of Hay for Seed. Two additional plots were included.

The experiment to compare different mixtures of seed for hay and pasture was discontinued, but instructors were requested to arrange for the laying down of seeds mixture demonstrations.

Live Stock Experiments and Demonstrations.

"Baby" Beef Experiment No. 1.—To obtain information as to the economic possibilities of feeding calves for the production of "Baby" Beef. This experiment was discontinued.

Details of "Baby" Beef Experiment No. 3, which was incorporated in the scheme are given below.

"Baby" Beef Experiment No. 3.

Object.—To compare the returns from calves born in April and May when wintered as stores and sold off the grass at from 15 to 16 months old, with calves of similar age fed for "Baby" Beef during winter and spring, finished on grass and sold at the same time.

Conditions.—The experiment to be conducted with two lots of calves with, at least, three calves in each lot. All calves selected for an experiment to be as evenly matched as possible as regards breeding, age, and weight, and the sexes to be evenly balanced between the two lots. Calves born during the months of April and May, 1929, to be used, but the ages of individual calves in an experiment should not differ by more than six weeks.

Start of Experiment.—The location of the experiment should be decided during the summer and the calves selected not later than 1st October, 1929, prior to which date they should all be fed and managed alike. Weights of individual calves should be obtained at the beginning of the experiment, and the two lots balanced as evenly as possible.

Feeding and Management.

Lot 1—Stores.—To be housed in a loose box throughout the winter and spring, but allowed to run out in the daytime if this is the usual practice on the farm. Feeding to consist of hay and turnips as consumed, and an allowance of a mixture of equal parts of crushed oats and maize meal. The quantity of meal mixture should be 1lb. per head per day, increased to not more than 2lb. per head per day towards the end of the winter period. Drinking water to be provided. The calves in this lot to be turned out permanently to grass when this is being done with the other cattle on the farm and all hand feeding stopped.

Lot 2—Baby Beef.—To be housed continuously throughout the winter and spring, Feeding to consist of hay and turnips as for Lot 1, and an allowance of the following mixture of cake and meals:—

2	parts by weight	Crushed Oats.
1	" " "	Maize Meal.
2	" " "	Linseed Cake.
2	" " "	Palm Kernel Cake.

The quantity of concentrates to be fed should be not less than 1½lb. per head daily at the beginning of the test, and the daily allowance gradually increased as the test proceeds, but at no period should the daily allowance of the cake and meal mixture exceed 6lb. per head. A supply of drinking water should be available to the animals at all times. The calves in lot 2 should be turned out at the same time as those in lot 1 are turned out permanently, and both lots should be grazed on the same pasture. The calves in lot 2 should, however, be housed at night for about 3 weeks and given during that period a decreasing allowance of the cake and meal mixture morning and evening in the house. The feeding of a small quantity of the cake and meal mixture on the grass should be continued after this period and until selling time except in cases where the pasture is of outstanding quality. A separate record of the quantity of the cake and meal mixture consumed on the grass must be kept and it will be necessary to ensure that the animals of lot 1 have not access to this additional feeding. Grazing of both lots to be continued until, say the last week in July, or earlier if ready, when all the calves should be weighed and offered for sale. Records of the individual weights at the start and end of the experiment, and also of the quantity and cost of concentrates consumed by each lot, should be kept and these with the prices obtained for the calves, submitted to the Ministry.

Subsidy.—A maximum expenditure of £10, including £1 to the attendant will be approved for each experiment.

A breed experiment was substituted for the pig feeding experiment to compare indoor and outdoor fattening which was discontinued. Details of the breed experiment are given below.

Pig Experiment No. 1 (Breeds).

Object.—To compare Large White Ulster pigs, Large White York and Large White Ulster first-cross pigs and Large White York pigs for bacon production.

Plan of Experiment.—Three lots of pigs with a minimum of four pigs in each lot.

Lot 1.—Large White Ulster pigs (preferably pure bred).

Lot 2.—Pigs from first cross between pure-bred Large White York Boar and Large White Ulster Sow (the latter pure-bred for preference).

Lot 3.—Pure-bred Large White York pigs.

Where it is not possible to obtain suitable pigs for Lot 3, the experiment may proceed with the other two lots, but a special endeavour should be made to arrange experiments with all three lots.

Pigs to be selected for Experiment.—Average pigs representative of the two breeds should be selected and in the case of the cross-bred lot they should be the progeny of a York boar and Ulster sow. The pigs for all three lots should be as nearly as possible of the same age and not more than twelve weeks old at the start of the experiment. The initial weights of the pigs in each lot should also be as similar as possible, but provided all three lots have been equally well reared it is more important to have the ages alike than the initial weights when the latter do not vary to a considerable extent. All pigs for one lot need not be from the same litter.

Management.—Individual pigs to be earmarked at the start of the experiment and

the lots made up so that the sexes are equally balanced. All three lots to be housed under similar conditions and to receive similar feeding.

Feeding.—The following ration is to be used :—

7	parts	by	weight	Maize Meal.
5	"	"	"	Palm Kernel Meal.
5	"	"	"	Pollard.
2	"	"	"	Ground Oats.
1	"	"	"	Meat Meal.

If separated, skim or buttermilk is available in quantity up to one quart per pig daily, the meat meal should be excluded from the meal mixture.

Care should be taken to ensure that the quantity of meal mixture fed is in accordance with the requirements of the pigs in each lot. It may be found that the pigs in one lot may eat less or more than those in another lot. For that reason, and also to obtain definite information as to the comparative costs in each lot, the meal mixture should be kept in separate receptacles—one for each lot—and a check kept of the actual quantity of food consumed by each lot.

The meal mixture for all lots is to be moistened and fed in the raw state. Potatoes may be fed in addition, provided it can be arranged that they are given in similar proportion to each lot. This may be difficult to arrange if the meal consumption varies between the lots.

Records Required.—The live weights of individual pigs both at the beginning and end of test; the dead weights of individual pigs; the quantity and cost of foods consumed by each lot; and, if possible, the curer's opinion on the quality of the bacon. Wherever possible the Ministry's Chemical Research Division, Agricultural Buildings, Elmwood Avenue, Belfast, should be notified of the bacon factory to which the pigs are being sent, and also of the date of arrival there, so that arrangements may be made for the taking of samples of the back fat from pigs in each of the two lots.

Subsidy.—Not exceeding 10/- per pig or £10 for one experiment, which should include 10/- to the attendant.

Live Stock Demonstrations.—Details of live stock demonstrations included in the scheme are given below.

(1) *Calving Rearing.*—At least two of these demonstrations should be carried out by each instructor during the year.

Plan of Demonstration.—Each demonstration to consist of two lots of calves with two or three calves in each lot. A demonstration may start at any time provided calves of not more than six weeks old are used. Both lots of calves to be changed gradually from whole milk to separated milk or buttermilk, as directed in Leaflet No. 54. The milk should be fed in equal quantities to both lots and meals given as follows :—

Lot 1. Crushed oats fed dry after the milk.

„ 2.—A mixture of maize meal and linseed cake meal in equal parts fed as a gruel with the milk.

Farms where the system of feeding is similar to that given for Lot 2 should be selected for this demonstration.

Where demonstrations have been carefully carried out and records kept of the quantities of food fed, etc., a maximum subsidy of £1 per demonstration may be paid.

(2) *“Baby” Beef Production.*—The object is to demonstrate the value of “Baby” Beef production as compared with the production of stores as ordinarily carried out on the farm. Early calves (January or February) should be selected, and there should be at least two animals in the demonstration. It is desirable, however, that more than two animals be included if possible. The demonstration should start not later than October 15th. Feeding and management should be as follows :—

The animals must be housed and given a moderate allowance of good hay and turnips, and in addition an allowance of a meal mixture made up as for Lot 2 “Baby” Beef Experiment No. 3. The daily allowance of meals may be gradually increased from 2lb. per head at beginning of experiment to a maximum of 8lb. at end of experiment.

Provided that a demonstration has been carefully carried out and records kept of the quantities of food consumed, etc., a maximum subsidy of £2 10s. 0d., including 10/- to the attendant, may be paid.

(3) *Pig Feeding.*—Demonstrations on the feeding of pigs might include (a) the use of substitutes for separated milk, especially during the winter months; and (b) the feeding of uncooked meals as compared with cooked meals.

(4) *The Feeding of Dairy Cows.*—The value of feeding a balanced mixture of cake and meals as compared with a mixture of crushed oats and maize meal might be demonstrated.

The dishorning of young calves with caustic potash should be demonstrated at fairs and markets, or on such other occasions as opportunity permits.

SCHEME OF HORTICULTURAL EXPERIMENTS, 1928-29.

Alterations and modifications of the previous year's Scheme.

Experiment No. 1. Apple Scab (New Series). Each plot to receive a preliminary spray during February, of a 5% solution of a tar distillate. The plots in which it was used as the main spray have been discontinued.

Experiment No. 3. Manuring Blackcurrants. An additional series of plots was included.

The Acarine Disease Experiment was discontinued.

Details are given below of two supplementary experiments which were included in the scheme.

Experiment No. 4.

Apple Thinning.—This experiment should be carried out on trees of the variety Bramley's Seedling sprayed during 1929 with Bordeaux Mixture as directed for plot C. in Experiment No. 1—Apple Scab.

Object.—To increase the size of the fruit on heavy bearing trees by the removal of the superabundant, mal-formed and damaged fruit, and to overcome "off year" disadvantages.

When to Thin.—Thinning should be carried out when the fruits are about the size of small marbles, approximately at the end of June, as it can then be done rapidly with the fingers.

How to Thin.—First reduce the trusses so that only one apple—the best one—is left at each; then thin so that the fruit will be from eight to nine inches apart on the trees. In no case should blemished or mal-formed fruit be allowed to remain.

General.—Twelve trees typical of those in the orchard should be selected for this test—six to be thinned as directed above and six to be left unthinned. Care should be taken that all the trees selected are bearing approximately the same crop before thinning and that no "off year" tree is included, or, alternatively, that the same number of "off year" trees are included in each plot. This experiment to be carried out for 4 years, and the trees should be clearly marked for future identification.

Recording Results.—The fruit from each tree should be graded according to size and weighed as follows:—

- (a) Apples over 3 inches in diameter.
- (b) Apples over $2\frac{1}{2}$ inches but less than 3 inches in diameter.
- (c) Apples less than $2\frac{1}{2}$ inches in diameter.

Experiment No. 5.

Black Currant Mite.—This experiment is optional.

Object.—To test the value of an oil spray for the control of "Big Bud." Preliminary tests last season gave promising results and it is suggested that further tests should be carried out during the present summer by the horticultural instructors.

When to Spray. (a) Immediately before the blossoms open; and
(b) Immediately after the blossoms have set.

Spray Mixture. Oil spray, one part.
Water, 100 parts.
Soft Soap 1 lb. to 20 gallons of spray.

Control bushes need not be arranged for in this experiment. During March or April, however, the number of "swollen" buds should be counted on at least six typical bushes which should be marked for future years. It is desirable that all the black currant bushes in the plot or orchard should be included in the experiment.

GOVERNMENT OF NORTHERN IRELAND.

MINISTRY OF AGRICULTURE.

A.856/29.

Wellington Place,
Belfast.**BACILLARY WHITE DIARRHOEA.**

The Ministry views with some apprehension the gradual spread of bacillary white diarrhoea over certain areas in Northern Ireland and the reports, frequently without justification, that the disease is prevalent amongst station-holders under the Ministry's Poultry Schemes.

The Ministry has, therefore, decided to blood test systematically and free of charge :

- (1) All the birds at trap-nesting stations in Northern Ireland.
- (2) All the birds at stations where an outbreak has been confirmed or suspected.
- (3) All birds intended for breeding purposes, the property of a breeder or station-holder, who has competed at any of the Ministry's Egg-Laying Trials at Stormont, should the breeders and station-holders so desire.

The above proposals for blood-testing are subject to the following conditions, to which very careful attention must be given :—

Trap-Nesting Stations.

- (1) Two blood tests must be made each year of every adult bird, including birds six months old or over, for a period of three years and all re-acting birds disposed of for table purposes immediately after the report is received by the Instructor in Poultry-keeping from the Ministry's Animal Diseases Division.
- (2) No holder of a trap-nesting station will be permitted to bring on to the premises at which the station is situated hatching eggs, day-old chicks, pullets, hens or cockerels until the sanction of the Instructor or the Ministry has first been obtained.

Failure to comply with these conditions will entail the withdrawal of recognition from the trap-nesting station.

Breeders and Station-holders who have competed at the Ministry's Egg-laying Trials at Stormont.

Whilst blood testing for the elimination of carrier birds is obligatory in the case of trap-nesting stations, the work will only be undertaken for breeders and station-holders, subject to a written application being received by the Ministry and the breeder or station-holder signing a statement that he will comply with the following conditions :—

- (1) All birds as directed by the County Instructor must be blood tested twice each year for a period of three years and all re-actors immediately disposed of for table purposes only.

Note in this connection that where conditions are suitable, as for example, on the premises of large breeders, it may suffice to confine blood-testing to all adult birds intended for breeding purposes, but County Instructors must satisfy themselves that this is possible before agreeing to such procedure.

- (2) No eggs for hatching purposes, day-old chicks, pullets, hens or cockerels may be brought on to the premises until the sanction of the Ministry or the Instructor has been obtained. Such sanction will not be given unless the Ministry or Instructor is satisfied that the stock, etc., is coming from premises which are free from bacillary white diarrhoea.

Instructors in Poultry-keeping should take immediate steps to arrange for the systematic blood testing of all trap-nesting stations and should make the conditions of this scheme known to the private breeders and station-holders in their area who have been competing at Stormont.

Private poultry-breeders who have not been competing at Stormont may have their flocks blood-tested at a nominal charge of 6d. per test per bird (including cost of rings) ; full particulars are contained in the enclosed scheme.

Instructors in Poultry-keeping are reminded that testing is not carried out at the Animal Diseases Division on Mondays or Saturdays. For the present no change will be made in the existing arrangement whereby the Animal Diseases Division selects a date for the submission of blood samples from alternative dates notified by the Instructor. Supplies of sterile tubes for testing purposes will be supplied to Instructors on application to the Animal Diseases Division, Stormont. Copies of all reports issued by the Animal Diseases Division will be sent to the Instructor concerned.

To each Itinerant Instructor in Poultry-Keeping.

(Signed) J. V. COYLE.

13th July, 1929.

GOVERNMENT OF NORTHERN IRELAND.

MINISTRY OF AGRICULTURE.

SCHEME FOR TESTING FOR BACILLARY WHITE DIARRHOEA.

Outbreaks of bacillary white diarrhoea are becoming increasingly frequent and there are signs that the disease is spreading in Northern Ireland.

When an outbreak of bacillary white diarrhoea has been confirmed amongst chickens it is essential that the poultry breeder should realise that surviving birds commonly become carriers and that when they reach the laying stage they produce eggs containing the germ of the disease. Chicks hatched from such eggs are diseased and infect healthy chicks with which they come in contact.

Under such circumstances the only method of preventing outbreaks and of eliminating the disease from the flock is to cull out the carrier birds and dispose of them for table purposes. The blood test is the only reliable means of detecting carriers, and if proper methods of blood testing and sanitation are adopted the disease can be completely eradicated from a flock in three years and at a very small cost. It should, however, be clearly understood that blood testing has little or no value unless proper precautions are taken at the poultry farm.

The Ministry is prepared to undertake blood-testing at a nominal charge of 6d. per test per bird (including cost of rings) for any private breeder upon whose premises an outbreak of bacillary white diarrhoea has been confirmed, provided he is prepared to comply with the following regulations :—

- (1) No hatching eggs or day-old chicks are brought on to the farm except from a source approved of by the Ministry.
- (2) No pullets, hens or stock cockerels are brought on to the farm except from a source approved of by the Ministry.
- (3) Proper sanitation is maintained in connection with the breeding flock and the chicken-rearing plant.
- (4) No second-hand incubators, brooders, or other rearing appliances are brought on to the premises.
- (5) To provide adequate assistance in connection with the taking of blood samples by the Instructor or other authorised officer.

Poultry breeders upon whose premises an outbreak of bacillary white diarrhoea has been confirmed and who are desirous of having their flock blood-tested with a view to eliminating the adult carrier birds, should communicate direct with the Instructor in Poultry-keeping for their county or district (see list of names and addresses at end of scheme).

On receipt of such information the Instructor in Poultry-keeping or other authorised officer will visit the farm in due course, advise as to the birds to be blood-tested, arrange for taking the samples and despatch them to the Ministry's laboratory for examination.

Applications for testing should be made direct to the Ministry after the County Instructor in Poultry-keeping has visited and decided as to the number of birds to be tested, and the requisite fees should be submitted with the application.

If facilities exist at the farm for keeping the breeding birds free from contact with all other birds of the flock it will usually suffice to test the birds intended for breeding purposes twice before they are actually mated. If such a scheme of double testing is carried out during three consecutive seasons, it should lead to the elimination of the disease provided that the precautions specified in paragraph 4 are strictly observed.

In connection with those precautions, poultry-breeders are urged to consult the Instructor in Poultry-keeping in their district before making any purchases. Unless those instructions are strictly adhered to the blood-testing may be rendered valueless and infection may remain on the farm for an indefinite period.

NAMES AND ADDRESSES OF INSTRUCTORS IN POULTRY-KEEPING IN NORTHERN IRELAND.

<i>County.</i>	<i>Name.</i>	<i>Address.</i>
Antrim ..	Miss A. M. Nedwill Miss A. Mahony	c/o. The Secretary, County Antrim Committee of Agriculture, County Courthouse, Belfast.
Armagh ..	Miss A. G. English	c/o. The Agricultural Organiser, County Armagh Committee of Agriculture, 4, College Street, Armagh.
Down ..	Miss W. McMullen Miss L. Walters	c/o. The Agricultural Organiser, County Down Committee of Agriculture, Northern Bank Chambers, May Street, Belfast.
Fermanagh .	Miss A. M. Callery	c/o. The Secretary, County Fermanagh Committee of Agriculture, Courthouse, Enniskillen.
Londonderry	Miss L. Gray Miss E. E. Clarke	c/o. The Secretary, County Londonderry Committee of Agriculture, Courthouse, Coleraine.
Tyrone ..	Miss M. H. Davidson Miss M. A. C. Woods	c/o. The Secretary, County Tyrone Committee of Agriculture, Courthouse, Omagh.

GOVERNMENT OF NORTHERN IRELAND.

MINISTRY OF AGRICULTURE.

LICENSING OF BULLS IN THE IRISH FREE STATE AND NORTHERN IRELAND.

Live Stock Breeding Acts.

It has come to the notice of the Department of Agriculture, Irish Free State, and the Ministry of Agriculture, Northern Ireland, that the arrangement which has been in force for some time past, whereby bulls which were licensed or rejected in the Irish Free State were automatically licensed or rejected when imported into Northern Ireland or vice versa, has been abused by some cattle dealers, who have made a practice of transferring across the border bulls which, subsequent to being licensed, have not been properly cared and which, therefore, have deteriorated and become unsuitable for breeding purposes. In these circumstances it has been decided to terminate the existing arrangements except in so far as bulls which are passed for

licences at the Shows and Sales specified below are concerned, and the following new arrangement will, therefore, come into operation on the 1st August, 1929 :—

1. *Bulls Imported from the Irish Free State to Northern Ireland.*

Every bull of the prescribed age brought into Northern Ireland from the Irish Free State (except those which are passed for licences at the Shows and Sales specified below where bulls are selected for premiums) will require to be examined by Inspectors of the Ministry of Agriculture, Northern Ireland, and will be either licensed or rejected on its merits. It may, therefore, happen that a bull licensed in the Irish Free State will be rejected for a licence in Northern Ireland.

2. *Bulls Imported from Northern Ireland to the Irish Free State.*

Every bull of the prescribed age brought into the Irish Free State from Northern Ireland (except those which are passed for licences at the Shows and Sales specified below where bulls are selected for premiums) will require to be examined by Inspectors of the Department of Agriculture, Irish Free State, and will be either licensed or rejected on its merits. It may, therefore, happen that a bull licensed in Northern Ireland will be rejected for a licence in the Irish Free State.

3. *Bulls passed for licences at specified Spring Shows and Sales.*

An arrangement has been come to between the Department of Agriculture, Irish Free State, and the Ministry of Agriculture, Northern Ireland, whereby bulls passed for licences at the undermentioned Spring Shows and Sales will be licensed either in the Irish Free State or in Northern Ireland on application to the appropriate Ministry and on payment of the prescribed fees.

<i>Irish Free State.</i>				
<i>Name of Society.</i>		<i>Venue.</i>		<i>Date.</i>
Royal Dublin Society	.. .. .	Dublin		February or March.
<i>Northern Ireland.</i>				
Royal Ulster Agricultural Society	.. .. .	Belfast		February or March.
North-West of Ireland Agricultural Society		Londonderry		February or March.

GOVERNMENT OF NORTHERN IRELAND.

MINISTRY OF AGRICULTURE.

**SCHEME FOR IMPROVEMENT OF AGRICULTURAL HOLDINGS
BY DRAINAGE AND OTHER WORKS AND FOR EXTENDING
EMPLOYMENT IN RURAL AREAS.**

With a view to providing additional employment in rural areas and to the improvement of agricultural holdings the Ministry of Agriculture is authorised by the Government, subject to the conditions set out herein, to consider applications for financial assistance from farmers or land-owners for the carrying out of approved works of the following character :—

- (a) Drainage of agricultural land, including hill drainage and such preliminary operations as the quarrying, breaking and cartage of the necessary stones, the removal of trees, hedges, whins, etc. Drains may be constructed with stones, tiles, or in such other recognised manner as will ensure a more or less permanent benefit.
- (b) The improvement of ditches and water-courses.
- (c) The improvement of roads in private ownership which are used for the purpose of agriculture, turbary or forestry.

This scheme does not extend to works by County Councils under the Drainage Act (N.I.), 1925.

1. *Grants*.—Financial assistance in respect of any approved works will take the form of a grant not exceeding half the approved cost of the work, including materials, such as tiles, with a maximum of £10 per statute acre for drainage works of the nature specified at (a) above, but, except as indicated in the succeeding paragraph, the grant shall in no case exceed the total amount paid in wages to unemployed men engaged specially for the work through the Unemployment Exchanges. Grants may in certain circumstances be supplemented by loans, particulars of which are given in paragraph 9 of this scheme.

2. *Labour*.—All men whose wages are to be included in the Grant in respect of any approved works must be recruited through the Employment Exchanges: provided, however, that in the case of larger schemes where special supervisors, *e.g.*, foremen, have to be employed and where suitable men for this purpose cannot be obtained from the Exchanges, applicants may, with the sanction of the Ministry, obtain such foremen otherwise than through the Exchanges and in such cases the wages of the foremen may be included in the cost of labour for the purpose of calculating the grant payable under this scheme.

3. *Rate of Wages*.—The wages to be paid must accord generally with the rates paid for similar work in the district where the work is being carried out and the decision of the Ministry of Agriculture as to an appropriate wage in any particular case shall be final.

4. *Applications*.—Applications for grants must be made to the Ministry of Agriculture on the prescribed form, copies of which may be had from that Ministry. Occupiers of adjoining lands may submit a joint co-ordinated scheme. Applications sent in without full details cannot be considered.

5. *Commencement of Works*.—Works in respect of which it is intended to claim grants should not be commenced until the Ministry of Agriculture has notified its approval in writing. A condition of such approval may be that the works shall be completed within a reasonable time.

6. *Inspection*.—All work under an approved scheme shall be subject to inspection from time to time by a duly authorised representative of the Ministry.

7. *Payment of Wages*.—The applicant will pay the wages of the men employed on approved works on the Friday of each week. When being paid each man will give a receipt on the form, copies of which will be supplied by the Ministry. Such receipt forms must be carefully preserved as they will be required by the Ministry before any grant can be paid.

8. *Payment of Grants*.—Immediately approved works have been completed the applicant should on the prescribed form advise the Ministry who will arrange for the payment of the grant on being satisfied that the work has been properly carried out and that any directions in connection therewith, which may have been given by the Ministry or their Inspector have been complied with. Advances may be made by the Ministry from time to time as the work progresses. Claims for payment of grants in respect of works approved by the Ministry during 1929, should, where practicable, be lodged before 31st January, 1930. Claims should be accompanied by receipts showing the whole cost of the works both as regards wages and materials.

9. (a) *Loans*.—The above contemplates a grant by the Ministry in the region of half the cost of approved works. It is recognised, however, that at the present time many farmers may find it difficult to finance the remaining portion of the cost.

Accordingly in making application for grants on the prescribed form, the applicant should indicate thereon whether he also requires a loan to assist him in financing the works and the amount of such loan. Such a loan, if approved, must be secured in one of two ways:—

(a) a charge on the holding;

(b) a promissory note signed by the borrower and two sureties approved by the Ministry.

Loans secured as at (a) will be arranged by the Ministry of Finance and only in exceptional circumstances will loans be made for amounts of less than £50, and they

are subject to certain limits which vary according to the value of the lands to be charged. Such loans will be repayable over a period of 22 years by means of an annual rent-charge calculated at the rate of £7 16s. 2d. at present rate of interest for each £100 borrowed, this charge covering Principal and Interest. A small charge is made to cover legal costs.

Loans secured as at (b) will be arranged by the Ministry of Agriculture and will be repayable with interest by instalments spread over a period of 5 years.

A loan will be issued either in a lump sum on the completion of the work or by instalments if of an appreciable amount.

Further details in regard to loans will be furnished on application for grant.

10. *Ministry's Decision Final.*—The decision of the appropriate Ministry in any matter regarding grants or loans under this scheme shall be final.

MINISTRY OF AGRICULTURE,
WELLINGTON PLACE,
BELFAST.

